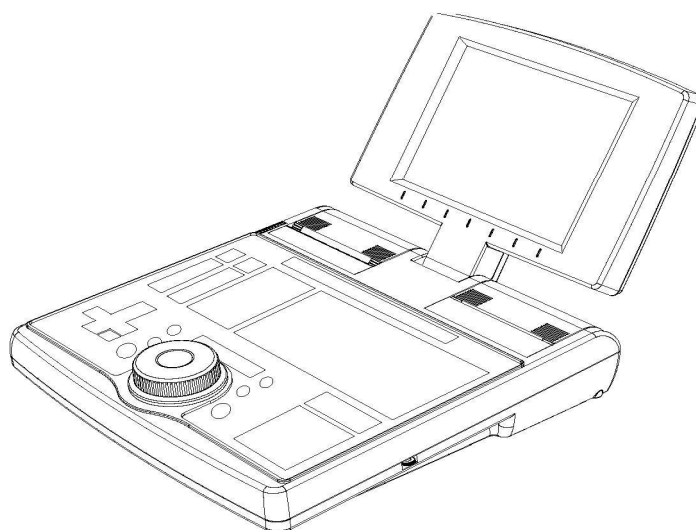
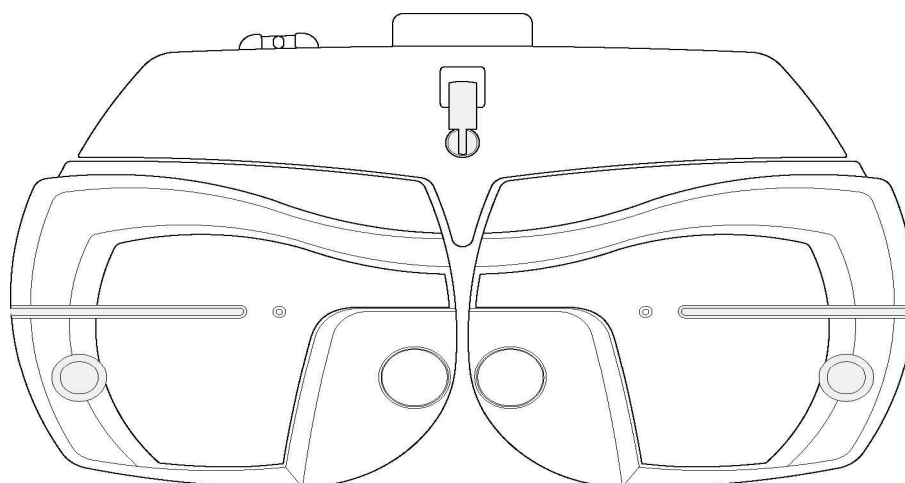


# **User's Manual**

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## **Digital Refractor GDR-7000**



## Safety Information

### 1. Introduction

Safety is everyone's responsibility. The safe use of this equipment is largely dependent upon the installer, user, operator, and maintainer. It is imperative that personnel study and become familiar with this entire manual before attempting to install, use, clean, service or adjust this equipment and any associated accessories. It is paramount that the instructions contained in this manual are fully understood and followed to enhance safety to the patient and the user/operator. It is for this reason that the following safety notices have been placed appropriately within the text of this manual to highlight safety related information or information requiring special emphasis. All user, operators, and maintainers must be familiar with and pay particular attention to all warning and cautions incorporated herein.



#### **WARNING**

"Warning" indicates the presence of a hazard that could result in severe personal injury, death or substantial property damage if ignored.



#### **NOTE**

"Note" describes information for the installation, operation, or maintenance of which is important but hazard related if ignored.



#### **CAUTION**

"Caution" indicates the presence of a hazard that could result in minor injury, or property damaged if ignored.

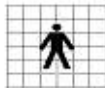
## 2. Safety Symbols

The International Electro technical Commission (IEC) has established a set of symbols for medical electronic equipment, which classify a connection or warn of any potential hazard. The classifications and symbols are shown below.

Save these instructions



I and O on power switch represent ON and OFF respectively.



Type B Isolated patient connection.



This symbol identifies a safety note. Ensure you understand the function of this control before using it. Control function is described in the appropriate User's or Service Manual.



Manufactured by xxxx (year).



Identifies the point where the system safety ground is fastened to the chassis. Protective earth connected to conductive parts of Class I equipment for safety purposes.

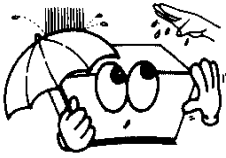
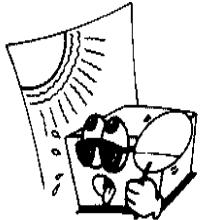
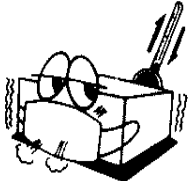
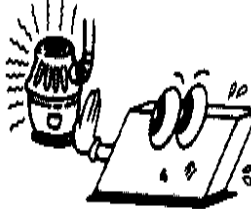
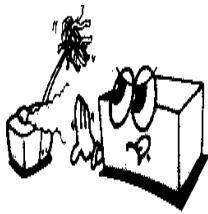


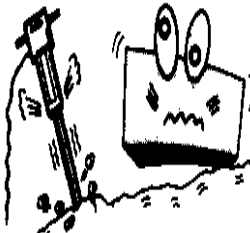
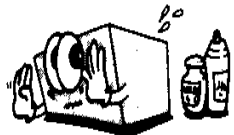
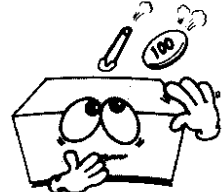
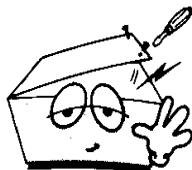
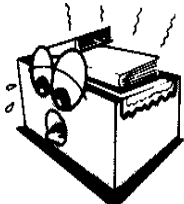
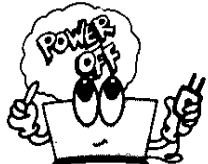
UL2601-1  
CAN/CSA C22.2  
NO.601.1

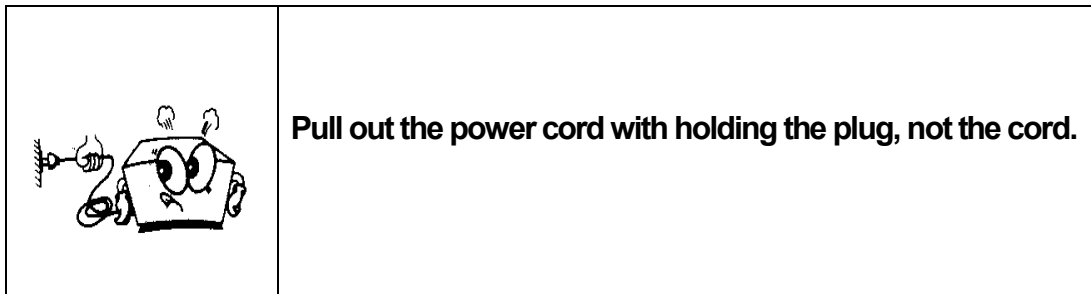
MEDICAL EQUIPMENT  
WITH RESPECT TO ELECTRIC SHOCK  
FIRE AND MECHANICAL HAZARDS ONLY IN  
ACCORDANCE WITH UL 2601-1 AND CAN/CSA C22.2  
NO. 601.1

### 3. Environment factors

Avoid the following environments for operation or storage:

	Where the equipment is exposed to water vapor. Don't operate an equipment with a wet hand.
	Where the equipment is exposed to direct sunlight.
	Where the temperature changes extremely. Normal operating temperature range is from 10°C to 40°C, Humidity is from 30% to 75%.
	Where it is near the heat equipment.
	Where the humidity is extremely high or there is a ventilation problem.

	<p>Where the equipment is subject to excessive shocks or vibrations.</p>
	<p>Where equipment is exposed to chemical material or explosive gas.</p>
	<p>Be careful not to be inserted dust, especially, metal</p>
	<p>Don't disassemble the product or open. We aren't responsible for it for nothing.</p>
	<p>Be careful not to close the fan located on the lateral or back side of the equipment.</p>
	<p>Don't plug the AC power cord into the outlet before the connection between devices of the equipment is completed. This can generate the defect.</p>



Avoid places where the ambient temperature falls below 10°C or exceeds 40°C for normal operation, or below -10°C or exceeds 40°C (14°F-104°F) for transportation and storage. Humidity should be maintained between 30 and 75% for normal operation, transportation and storage. Avoid environments where the equipment is exposed to excessive shocks or vibrations.

#### **4. Safety Precaution**

This equipment has been developed and tested according to safety standards as well as national and international standards. This guarantees a very high degree of safety for this device. The legislator expects us inform the user expressively about the safety aspects in dealing with the device. The correct handling of this equipment is imperative for its safe operation. Therefore, please read carefully all instructions before switching on this device. For more detailed information, please contact our Customer Service Department or one of our authorized representatives.

- This equipment must not be used (a) in an area that is in danger of explosions and (b) in the presence of flammable, explosive, or volatile solvent such as alcohol, benzene or similar chemicals.
- Do not put or use this device in humid rooms. Humidity should be maintained between 30 and 75% for normal operation. Do not expose the device to water splashes, dripping water, or sprayed water. Do not place containers containing fluids, liquids, or gases on top of any electrical equipment or devices.
- The equipment must be operated only by, or under direct supervision of a

properly trained and qualified person.

- Modifications of this equipment may only be carried out by GILRAS's service technicians person.
- Customer maintenance of this equipment may only be performed as stated in the User's Manual and Service Manual. Any additional maintenance may only be performed by GILRAS's service technicians or other authorized person.
- The manufacturer is only responsible for effects on safety, reliability, and performance of this equipment when the following requirements are fulfilled: (1) The electrical installation in the respective room corresponds to the specifications stated in this manual and (2) This equipment is used, operated, and maintained according to this manual and Service Manual.
- The manufacturer is not liable for damage caused by unauthorized tampering with the device(s). Such tampering will forfeit any right to claim under warranty.
- This equipment may only be used together with accessories supplies by GILRAS's If the customer makes use of other accessories, use them only if their safe usability under technical aspect has been proved and confirmed by GILRAS or the manufacturer of the accessory.
- Only person who have undergone proper training and instructions are authorized to install, use, operate, and maintain this equipment.
- Keep the User's Manual and Service Manual in a place easily accessible at all times for persons operating and maintaining the equipment.
- Do not force cable connections. If a cable does not connect easily, be sure that the connector (plug) is appropriate for the receptacle (socket). If you cause any damage to a cable connector(s) or receptacle(s), let the damage(s) be repaired by an authorized service technician.
- Please do not pull on any cable. Always hold on to the plug when disconnecting cables.
- This equipment may be used for the international application related to Visual Acuity Test, Astigmatism Test, Phoria Test, Stereo Vision Test according to this manual.
- Before every operation, visually check the equipment for exterior mechanical damage(s) and for proper function.
- Do not cover any ventilation grids or slits.
- Immediately turn off and unplug any equipment that gives off smoke,

sparks, strange noises, or odors.

- **Battery Serving:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.



### CAUTION

Digital Refractor is heavy, so please fix it on the unit table not to be moved. Otherwise, heavy equipment crash to fall examinee. As a result, examinee may be hurt.



### CAUTION

To perform automatic POST (Power on Self Test), Digital Refractor moves left and right side. To avoid injury of examinee, please keep examinee from Digital Refractor at least 20cm or more during POST initialization.



### CAUTION

Do not place your hand or finger between the left and the right side of Digital Refractor. Also ensure that the examinee does not place his/her hand or fingers there either. Otherwise, hand or fingers may be hurt.



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## 1. Features

- Using standard protocol CAN, all appliances are connected by daisy-chain line. As a result, GDR-7000 system makes office environment more clean and modest.
- Because 1 or more(up to 8) GDR-7000 system and 1 or more(up to 4 each) LM/RK are connected without any additional equipment, high utilization and low cost can be achieved.
- Compatibility between GILRAS products enables to manage patients' data more easily. For example, not only S/C/A value but also KER, PD data are gathered automatically from RK. Also S/C/A value, prism, additional power data are gathered automatically from LM. All of these data are presetting to the GDR-7000 system without manual control.
- GDR-7000 system supports near PD (45~75mm) and near working distance(35~70cm), so you can execute perfect near convergence tests.
- Separated Dual Cross Cylinder lens and automatic occlusion during lens change makes more accurate test result.
- For accurate Phoria and Strabismus test, GDR-7000 system support prism measurement by 0.1D unit up to 20D unit. Also automatic occlusion during prism change minimizes the examinee's eye adaptation.
- On-line guide assist examiners to finish test fast and convenient.
- To analyze result at a glance, GDR-7000 system supports table and graphic result display facilities.
- Built-in high-speed printer saves additional space to install printer equipments and prints test results extremely fast.
- PRESET faculty defers physical lens change until all the necessary lenses are properly set at any states.
- Dialog-driven menu and simple function button make it easy to access complicated faculties. In addition, Using [SHIFT]/[ALT] key combinations, various option and faculties are easily realized.
- To escape from the previous dialog as fast and convenient as possible, [ESC] key is supported.
- For professional examiners, 18 visual acuity tests, 24 monocular/binocular balance tests, 35 user defined unit tests are supported. Also Standard and 10 user defined programs are supported.

- The CDR-MATE program which supports PC-connectivity and PC-style printer interface is optional.
- Various binocular balance tests and phoria tests are supported. Advanced graphical guide systems for such complicated tests are also available.

## **2. Notes for using the Instrument**

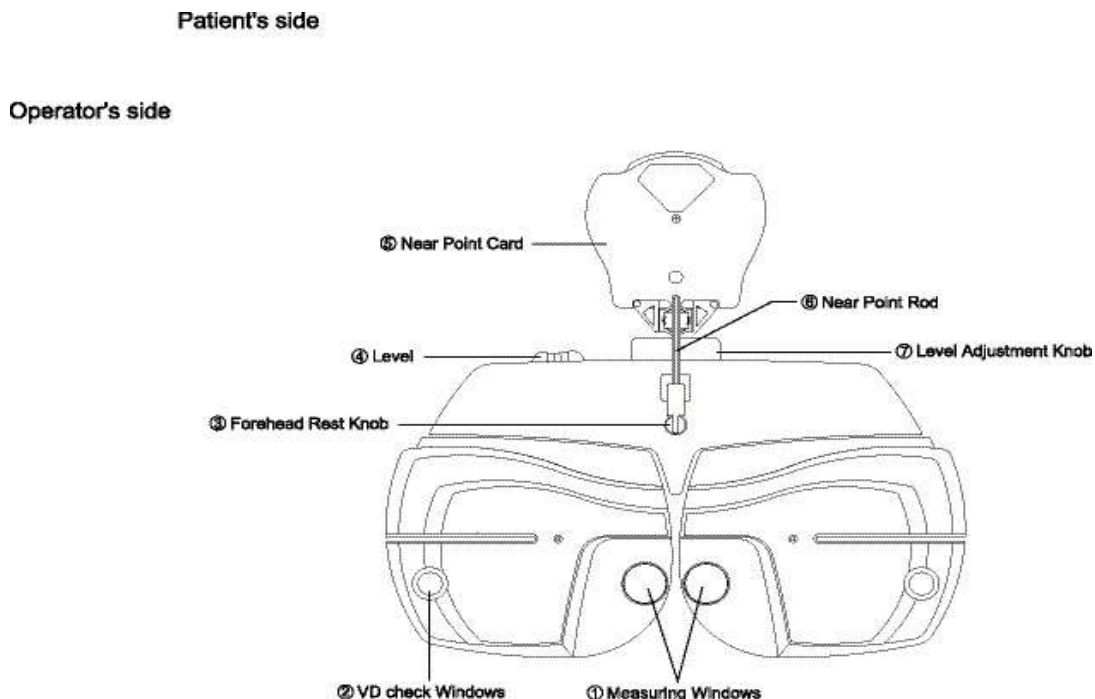
- This machine may be affected and malfunctioned by the electromagnetic wave of cellular phone, handie talkie, or toy operated by radio. Keep this machine away from such radio device that interfere with normal functions.
- The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. GILRAS assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained herein.
- GILRAS reserves the right to make changes in its products or product specifications at any time without prior notice, and is not required to update this documentation to reflect such changes.
- Do not hit or drop the instrument. The instrument may be damaged if it receives a strong impact. The impact can damage the function of this instrument. So handle with care.
- Too bright indoor light can influence on the result of accurate measurement.
- If you want to connect this with other equipments, consult the dealer.
- Sudden heating of the room in cold areas will cause condensation on the protective glass in the measurement window and on optical parts inside the instrument. In this case, wait until condensation disappears before performing measurement.
- Keep clean the objective glass of the examinee side. If it is stained with other substance, it may effect on error or inaccurate measurements.

### 3. Component List and Functions

The three basic components of the GDR-7000 system are Digital Refractor, Junction Box, and Operation Panel. In this chapter, component lists and functions are explained one by one. Also various accessories are summarized in the later part.

#### 3.1 Digital Refractor

Digital Refractor is most important part of the GDR-7000 system, and it is installed in the unit table like CRT series.



#### Explanation

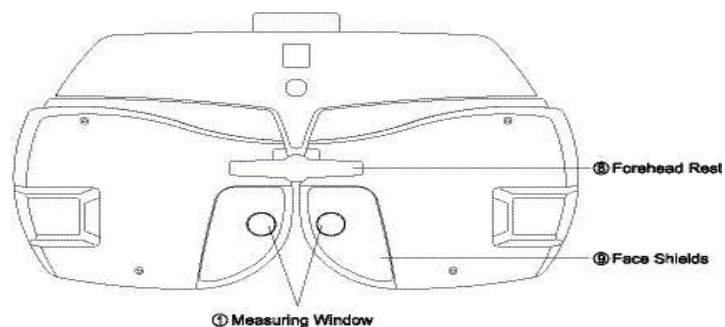
- 1) Measuring Windows: patient look at the chart through these windows.
- 2) VD(Vertex Distance) Check Windows: Used to check the patient's VD(the distance from a corneal vertex point to the lens)
- 3) Forehead Rest Knob: Used to move the Forehead Rest forward and backward in order to adjust the vertex distance (VD).
- 4) Level: Used to verify that the refractor head is level.
- 5) Near Point Card: Used for ADD power measurement.

6) Near Point Rod: the distance from the patient's eye to the Near point card is marked in inches and centimeters.

7) Horizontal Knob: Used to adjust horizontal balance using the (4) Level

Patient's side

Operator's side



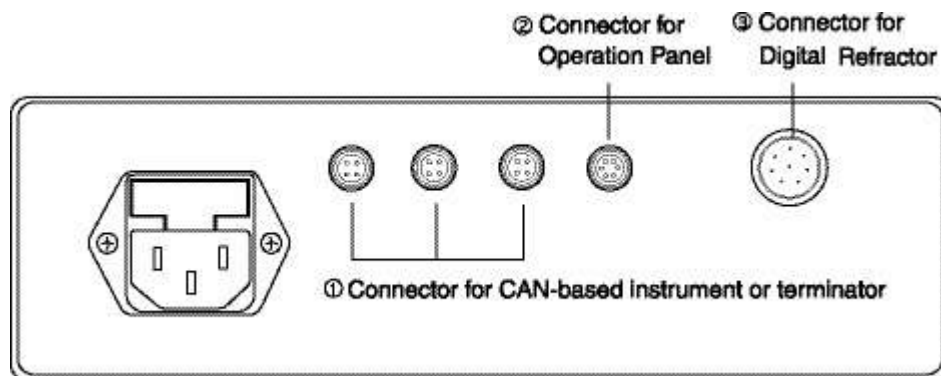
### Explanation

8) Forehead Rest: Patient's forehead should touch the rest during measurement.

9) Face Shields: Patient's face touches the shields during measurement. Clean them before measurement.

### 3.2 Junction Box

Junction box plays an important role in the connection among various devices (operation panel, RK, LM, GCP-7000 and PC). This component supplies not only communication channel but also power channel.



#### Explanation

##### 1) Connector for CAN-based instrument or terminator.

- Port to connect the Junction Box to a chart Presenting device
- Port to connect the Junction Box to RK or LM.
- Port to connect the Junction Box to another Junction Box.
- Port to connect a terminator for termination.

※ Be aware of the 4pin connector.

##### 2) Connector for Operation Panel

Port to connector the junction box to the Operation Panel.

※ Be aware of the 6pin connector.

##### 3) Connector for Digital Refractor

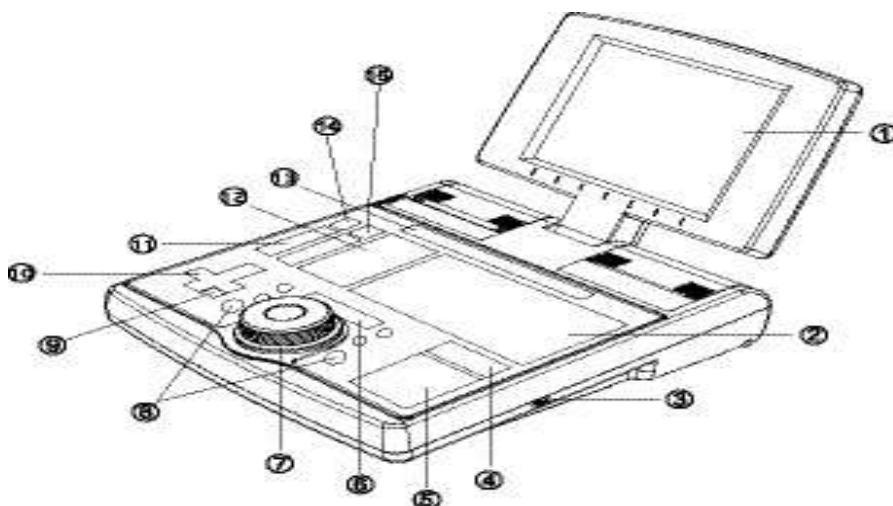
Port to connect the Junction Box to the Digital Refractor.

※ Be aware of the 8pin connector.



### 3.3 Operation Panel

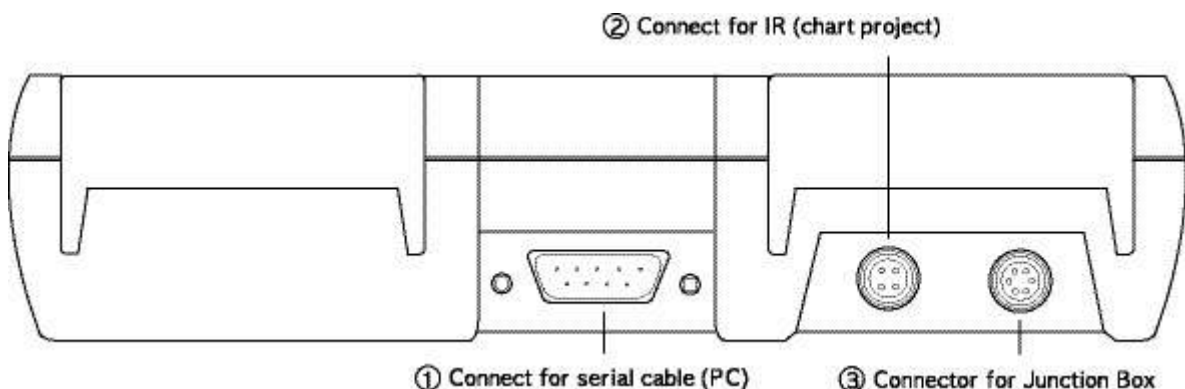
Operation Panel plays an important role as a brain which controls all the devices centrally. It is able to control Digital Refractor, the communication from RK(ref-kerato meter), LM(lensmeter), and(or) PC.



#### Explanation

- 1) LCD display: This screen is for information about the optometry data and procedures.
- 2) Buttons for Single Test Execution: These buttons are for the chart selection and examination execution in the same time. With the proper [ALT] button, user defined unit test can be executed.
- 3) Contrast Adjustment Knob: This knob is for the adjustment of the LCD display brightness.
- 4) Buttons of Program Execution: These buttons are for the execution of system/user defined program.
- 5) Buttons of Chart Mask: These buttons are for the chart mask(row/column/dot) and the mask movement(up/down/left/right) after the VA chart is presented in the wall.
- 6) Buttons of Eye Selection: These buttons are for the Right/Left/Binocular eye selection.
- 7) Dial: This dial changes the value(S/C/A/ADD/PRISM). The direction is left for the +, right for the -. Also this dial is used to change the value in the system configuration menu.

- 8) **Buttons for the Cross Cylinder Operation:** These buttons are used to flip Jackson Cross Cylinder Lens.
- 9) **Print Button:** this button is for printing the examination result.
- 10) **Buttons of Data Loading & Data Field Selection:** These buttons are for the selection of data field(UA, LM, SUBJ, FIN) and loading from LM/RK.
- 11) **Buttons of Menu Selection & Execution:** These buttons are for the selection of system configuration menu item.
- 12) **Selection Buttons of Data Element:** These buttons are most important keys in CDR and for the selection of S-C-A-ADD-VA-PRISM field.
- 13) **Button for Function Keys:** These buttons are for the selection of function keys in the LCD(bottom area)
- 14) **Escape Button:** This button is for escaping from the current mode to main examination mode.
- 15) **Switching of vision Test Mode:** This button is for changing between FAR and NEAR.



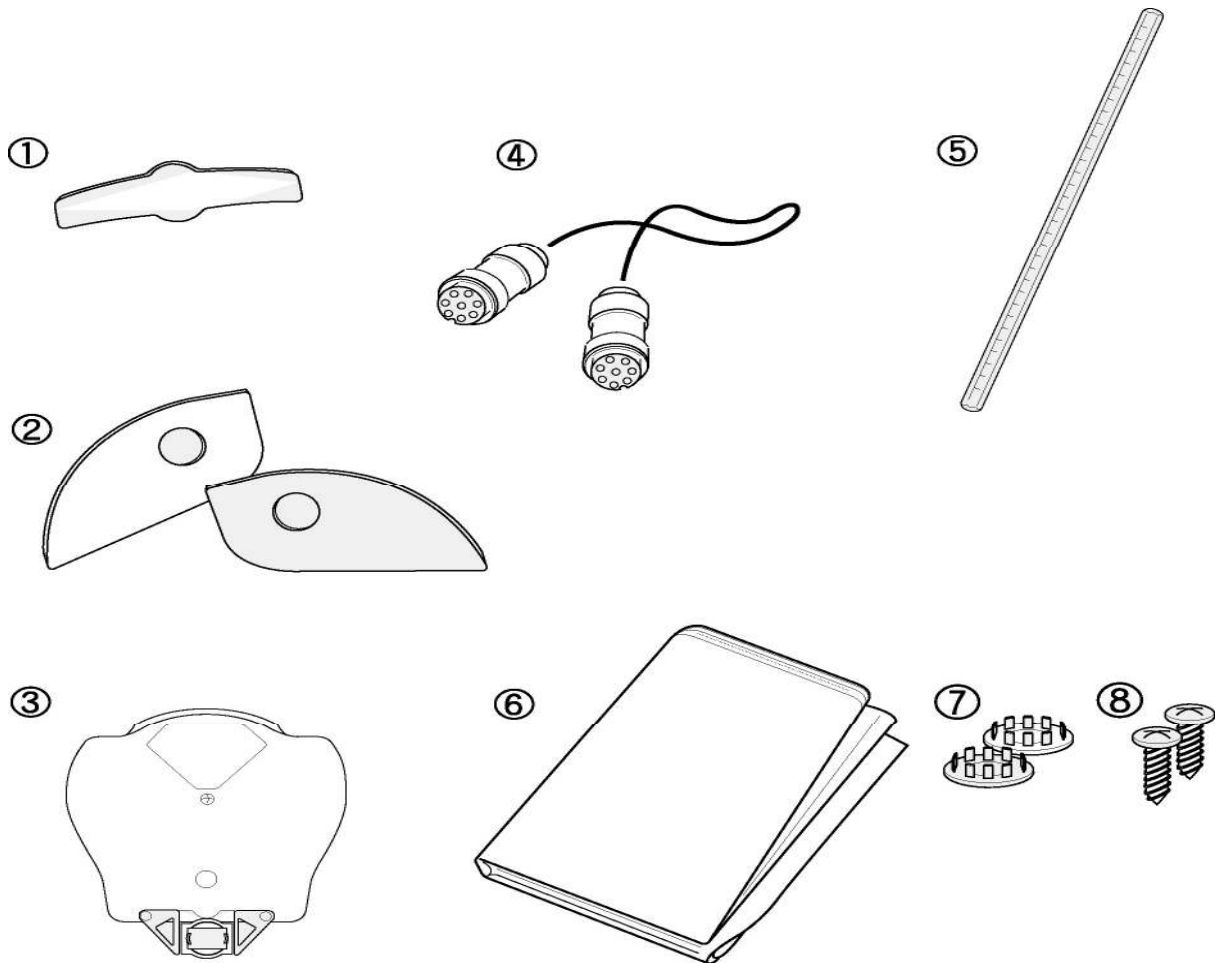
#### Explanation

- 1) **Serial interface:** Port to connect the Operation Panel to an external device with a serial cable. Normally this port is used for downloading and upgrading the Operation Panel. The type of connector is D-SUB 9-pin.
- 2) **IR interface:** Port to connect an interface cable with IR diode at the end of its one side. This interface is for communicating with a chart presenting instrument which doesn't support CAN communications.
- 3) **Connector for the Junction Box:** Port to connect the Operation Panel to the Junction Box. The type of connector is 6-pin

### 3.4 Various Accessories

This section introduces the various accessories included for GDR-7000 system.

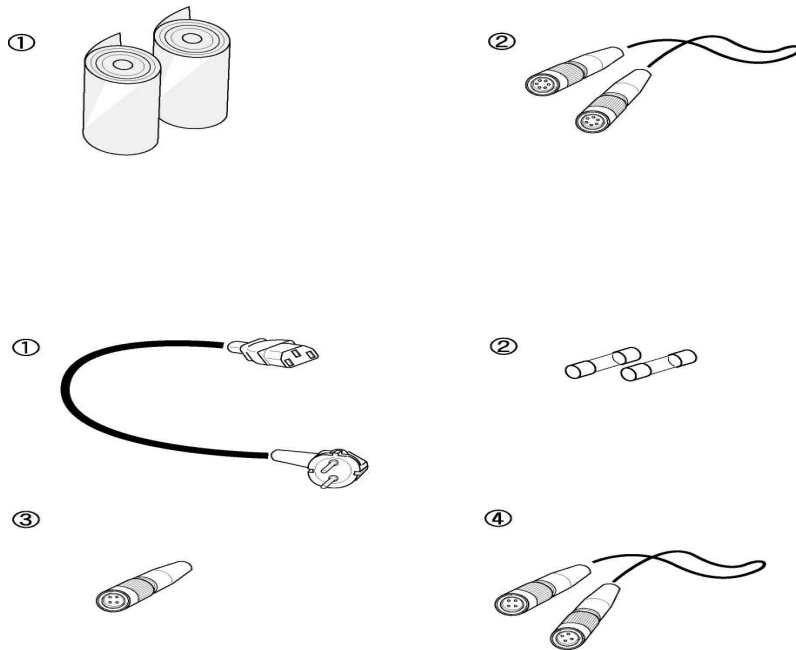
#### A. Accessories for the Digital Refractor



#### Explanation

- 1) Forehead rest(1EA)
- 2) Face shield(4EA): 2EA attached, 2EA as spare
- 3) Near Point Card(1EA)
- 4) Interface cable(1EA): CDR <-> JB, 8-pin CAN 3m
- 5) Near point Rod(1EA)
- 6) Dust Cover(1EA)
- 7) Bolt Cover(2EA)
- 8) Screw Bolt(2EA)

## B. Accessories for the Operation Panel



## C. Accessories for the Junction Box

### Explanation

#### Accessories for the Operation Panel

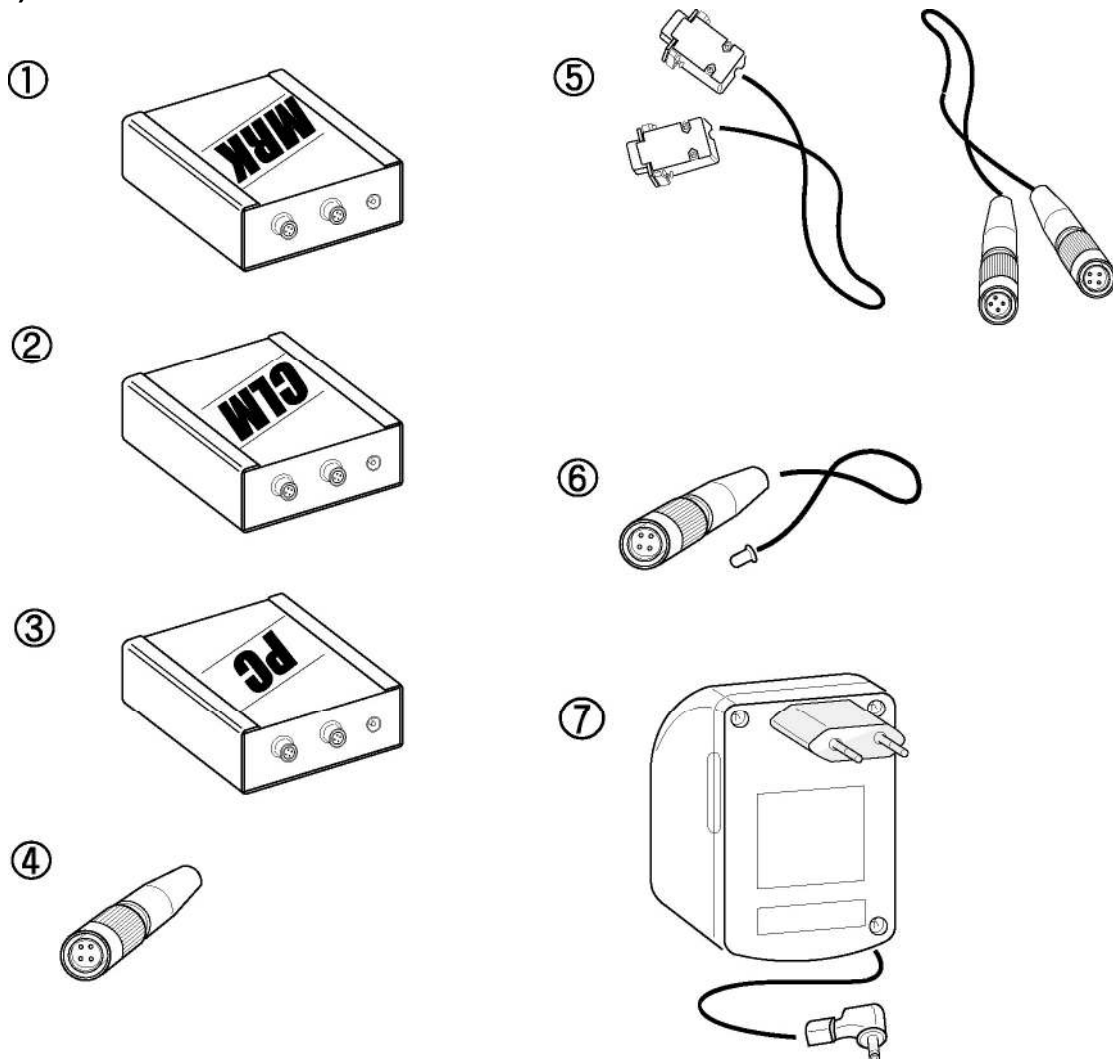
- 1) Printer Paper(3EA): 1EA loaded in the printer, 2EA as spare
- 2) Interface cable(1EA): OP<->JB, 6-pin CAN, 3m

#### Accessories for the Junction Box

- 1) Power Cord(1EA)
- 2) Spare Fuse(2EA): 250V, 5A
- 3) Terminator(1EA): 4-pin
- 4) Interface Cable(1EA): JB <->GCP-7000, 4-pin cable, 3m

## D. Optional Accessories

### i) Convert Box for RK



### Explanation

- 1) Convert Box for RK
- 2) Convert Box for LM
- 3) Convert Box for PC
- 4) Terminator
- 5) Interface Cable for Converter Boxes: i) LM/RK/PC <-> Converter Box: 9-pin D-SUB, 2m    ii) Junction Box(or Converter Box) <-> Converter Box: 4-pin CAN, 3m/6m/10m/20m
- 6) Interface Cable for Operation Panel: 4-pin IR, 2m
- 7) Power Adaptor: DC 9V

### **3.5 System Installation**

- Step 1. Check the accessories listed in 3.4 and prepare them for installation.**
- Step 2. Connect the Digital Refractor to the Junction Box(JB) with its interface cable in the 8-pin connector. Be sure not to connect instruments to the junction Box while the power is on.**
- Step 3. Connect the Operation Panel(OP) to the Junction box with its interface cable in the 6-pin connector.**
- Step 4. Connect the terminator to one of the 4-pin connectors in the Junction box. If the terminator is missed, the refractor won't work at all.**
- Step 5. Connect the chart presenting device to the Junction box with its interface cable in one of the 4-pin connectors unless it is not compatible with CAN protocol or is to be.**
- Step 6. Connect the power cord to the Junction Box. Before turning on the power, make it sure to check the voltage setting of the Junction Box is correct.**
- Step 7. Turn on the power of the chart presenting device.**
- Step 8. Turn on the power of the GDR-7000 system.**
- Step 9. Wait until the Digital Refractor finishes the initialization procedure.**
- Step 10. Check the LCD display or the controller and adjust its brightness and viewing angle by turning the contrast knob and moving the panel back and forth.**

#### 4. Inspection Modes

GDR-7000 system provides various inspection modes in order to satisfy complicated optometry needs. Such inspection modes seem to be complicated at first. But after you get used to them once, you can change modes fast and (as a result) classify and inspect your patient's data easily. There are six modes that GDR-7000 system provides.

- **EMPTY mode:** You can enter this mode when you turn on the power initially or press the [CLEAR] button.
- **UA mode:** This mode is for the unaided visual acuity test. Press the [UA] button to enter this mode.
- **LM mode:** This mode is for retrieving the data from LM. Press the [LM] button to enter this mode. Because loading job doesn't work automatically, you should use the [LOAD] button to receive the data from LM.
- **RK mode:** This mode is for retrieving the data from RK. Press button [RK] button to enter this mode. Because loading job doesn't work automatically, you should use the [LOAD] button to receive the data from RK

#### \*\*\* Special Feature:

GDR-7000 supports standalone and networked modes. In the standalone mode, if either [RK] or [LM] button is pressed, the latest transmission datum is automatically loaded. You don't need to press [LOAD], [RK], [EXE] buttons consequently.

#### (7/7) EXTERNAL INSTRUMENTS

Installation Type -> **STAND ALONE:** You can choose one between **STAND ALONE** or **NETWORKED**.

The above system option can be set by entering [MENU] – “system Config” and moving to page 7. After setting, press the [F6] button to save the new configuration.

EXTERNAL INSTRUMENT		
MRC Copy kerato	YES	NO
CLM Copy 1	YES	NO
CLM Copy ADD	YES	NO
Chart Connection	SERIAL	IR NONE
Chart Device	CCP-3100	
Controller Type	CP-4(A/DEC)	
Reset Type On Clear	SOFT RESET	HARD RESET
Installation Type	STAND ALONE	NETWORKED

- **SUBJ mode:** This mode is for inspecting with GDR-7000 system. Press the [SUBJ] button to enter this mode. You can think this mode as basic one.
- **FIN mode:** for calibrating the value after all the optometry processes are finished. Press the [FIN] button to enter this mode.

But there is hidden mode: **PRESET** mode and **AUX OFF** mode. In **PRESET** mode, you can hold lens not to move until finishing your job so that you can freely set the field value without engaging accommodation. **AUX** mode helps you to describe normal chart state for the patients by way of removing auxiliary lens for a while.



#### 4.1 Why Inspection Mode is Important?

You cannot understand why there are so many inspection modes at first. It seems that it is enough to start once and then do subjective optometry directly and it is spare of time to start from initial mode and change modes several times. But if you consider the following situation, you would know that such modes are greatly useful.

##### SCENARIO

First, optometrist measures the patient's vision with RK and inspects his/her glasses with LMP. Let's think about the following situation:

- 1) When you measure your patient's visual acuity with RK, you cannot understand the importance of the modes at this stage. Change the S-C-A values in this order after the patient's state.
- 2) All of a sudden, if you want to know the data from RK during subjective optometry. Without the aids of powerful mode conversion., you should use a sheet of paper and a pencil at your hand or printout inconveniently because the measured values of LCD screen beforehead have already overwritten. However, with your smart GDR-7000 system, just press the [RK] button and change into RK mode then you can check the RK data with ease and convenient manner.

PD 64.0	RK	
R	FAR	L
0.00	S	0.00
- 0.25	C	- 0.50
0	A	170
+ 0.50	ADD	+ 0.50
VA		

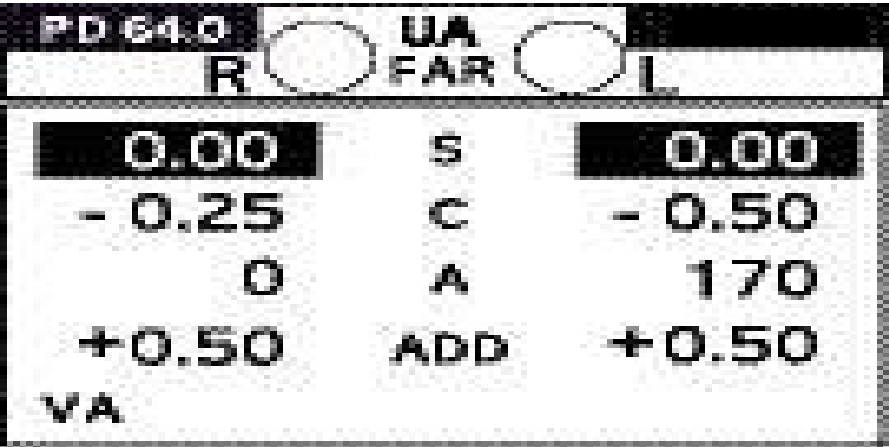
- 3) Now, you curiously want to glance over the data from LM. As you know, by simply applying 2), just press the [LM] button right now to change mode and then read the data from LM. That's all enough.

PD 64.0		<b>LM</b>	
R	<input type="radio"/>	FAR	<input type="radio"/>
<b>0.00</b>	S	<b>0.00</b>	
- 0.25	C	- 0.50	
0	A	170	
+0.50	ADD	+0.50	
VA			

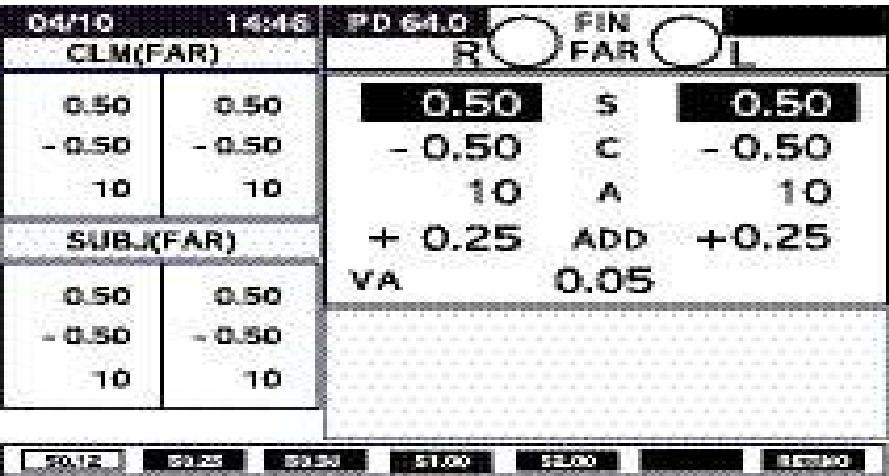
- 4) In the same way, you can allocate the other mode on the subjective optometry which changes the S-C-A values directly. Pressing the [SUBJ] button yields SUBJ mode. Of course, you can work in the initial mode. However in SUBJ mode you can change modes (SUBJ, RK, LM) freely and consequently compare SUBJ, RK, LM values without cost – the loss of data.

PD 64.0		<b>SUBJ</b>	
R	<input type="radio"/>	FAR	<input type="radio"/>
<b>0.00</b>	S	<b>0.00</b>	
- 0.25	C	- 0.50	
0	A	170	
+0.50	ADD	+0.50	
VA			

5) For measuring the unaided visual acuity, press [UA] button to enter UA mode. UA mode automatically opens VA fields. Furthermore, it helps to calculate and how the chart matching for the unaided visual acuity.



6) Nothing can be compared to [FIN] mode. [FIN]mode helps you to calibrate the final results by comparing the current visual acuity and the former glasses' one.



Various inspecting modes play an important role not to lose patient's optometry information and hold data for each mode. Therefore, it is clear that they are inevitable when you survey and analyze all the information.

## 4.2 Data Duplication

Mode change is always followed by data duplication. For example, if starting from initial mode and pressing the SUBJ button to enter SUBJ mode, you can see that all your previous works are duplicated as they are in the SUBJ. Likewise, changing some mode including SUBJ to another one causes data duplication. But there is an exception: UA mode. Comparing to others, UA mode works in a quite independent way. It doesn't have influence on other mode and it is not influenced from others.

There is a direct compulsive duplication method when changing into SUBJ mode from others. If SUBJ Startup is set to LM in "TEST & DATA MANIPULATION(2)" on system configuration page 4, it always reproduces the [LM] data into [SUBJ] and if RK, always from [RK] into [SUBJ]. Also, if [ANY], which is factory-defined initial value, from arbitrary mode into [SUBJ].

Data Duplication occurs only once to prevent unintended mistakes. For example, once duplication had arisen into [SUBJ] ever, the other one would not occur when returning to [SUBJ] from [RK] or [LM] mode.

Let's think the following situation where data duplication is applied to speed up optometry when [SUBJ] Startup is set to ANY in "TEST & DATA MANIPULATION(2)" on system configuration page 4.

### 1) Starting from the RK data

Change mode into RK and then load data from a refractometer. At this point, if SUBJ button is pressed, the RK data will be mechanically copied into SUBJ mode. You can modify the RK data directly but such method is not recommended. It will be more effective to leave them as the reference data for final decision and to use duplication method into SUBJ.

### 2) Starting from the LM data

After changing mode into LM, load data from a lensmeter. And then press [SUBJ] button to make automatic copy of the LM data into SUBJ mode. Also, you can see that changing into SUBJ mode is needed for preserving the reference data instead of working in LM mode.

**3) Finishing with FIN**

It is possible to change into FIN mode directly after setting the required values in initial mode. In case of using neither a refractometer nor a lensmeter, you can do the optometry process even more speedily because initial mode is regarded as SUBJ. So you can benefit from it.

**4.3 Warnings on mode**

Warnings on mode are presented here.

- 1) With the exception of UA and FIN, other modes are not compulsive. In other words, it is true that there is no harm loading and modifying the LM data in RK mode or the RK data in SUBJ mode. You should remind that RK, LM, SUBJ modes are only optometry convention as a matter of convenience.
- 2) Optometry in initial mode makes no problem, however, it is only recommended when there is no need to use other external instruments such as LM or RK and to compare the FIN result. It will be better to convert mode into SUBJ directly or after some basic optometry.
- 3) Once duplication had arisen while mode change, the other one would not occur when returning to the same mode from another. Data duplication occur only once to prevent unintended mistakes that miserably result in data loss.
- 4) In FIN mode, LM and SUBJ windows will be shown on the left side at the same time with which you can check the former state (LM), current state (SUBJ), and the finally corrected state (FIN). It is possible to press the [PRINT] button showing only results because you can change the values and examine your patient's response interactively.
- 5) If "SUBJ Startup" item is assigned in system option, you can modify from which mode data will be duplicated when the [SUBJ] button is pressed. Option are as follows.

**(4/7)TEST & DATA MANIPULATION(2)**

**SUBJ Startup -> ANY:** You can choose one among LM, RK, and ANY.

The above system option can be set by entering [MENU] -> "System Config" and moving to page 4. After setting, press the [F6] button to save the new configuration.

4/7 TEST & DATA MANIPULATION(2)	
Default Program	STANDARD
Input Fusion	YES NO 5
Input Stereo	YES NO
Input Coincidence	YES NO 4
Fog : Balance	[+0.00]D
Fog : Red/Green	[+0.00]D

SUBJ Startup
CLM
MRK
ANY

BACK
NEXT
RESET
OK
CANCEL

#### 4.4 PRESET Mode and AUX OFF Mode

##### A. PRESET mode

In PRESET mode, lens doesn't change in spite of converting the S-C-A-VA-ADD-PRISM values. This makes patients comfortable when setting the data by hands from RK or LM unconnected to networking.

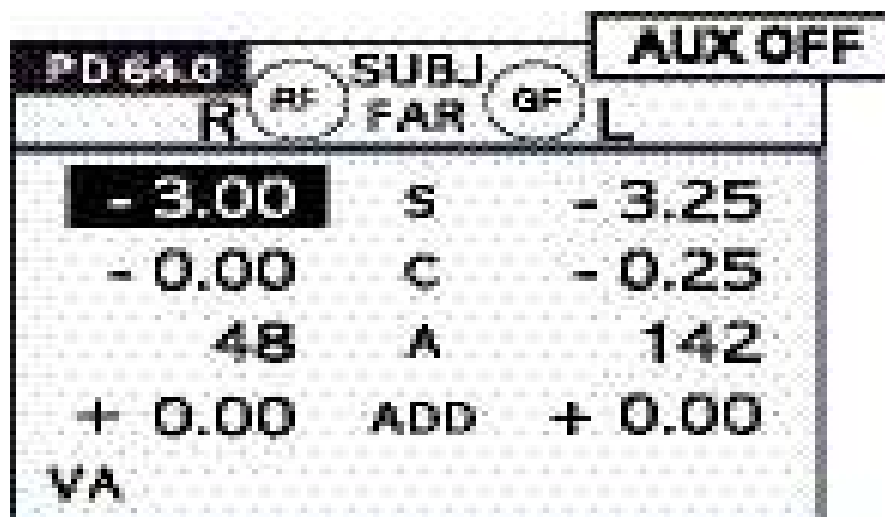
Pressing [SHIFT] + [SET] buttons make the signal on the right top of the screen PRESET. After seeing that, you can set the necessary values freely moving around several fields. After all the field values are assigned, press [SHIFT] + [SET] one more time to exit PRESET mode and make Digital Refractor load lenses all at once based on these setting values.

PD 64.0		SUBJ		PRESET
R		FAR		L
- 3.00	S	- 3.25		
- 0.00	C	- 0.25		
48	A	142		
+ 0.00	ADD	+ 0.00		
VA				

**B. AUX OFF mode**

AUX OFF mode temporarily removes auxiliary lenses such as polarized, red/green, fixed cross cylinder,  $6\Delta$ BU and  $10\Delta$ BI during system-provided unit tests (especially, Binocular Balance, Polarized Red/Green, and Stereo tests). It will provide great efficiency when you want to remove auxiliary lens for a while to explain your patient procedures on measurement.

If you press [ALT] + [OPEN/COLSE](left) or [ALT] + [OPEN/COLSE](right) buttons, then the state signal, AUX OFF will be shown on the right top of the screen. To go one more time or another chart/field button.



#### 4.5 Measuring Near and Far Vision

When we say optometry, it almost means far vision. In the old days, there were so many hypermetropia (far-sightedness) problems but recently according to the development of media such as TV or computer, which drives one's eyes very hard, myopia (near-sightedness) is getting more and more prevalent. From here, we mostly assume far vision, however there is only one exception: additional spherical power, specially, in case of presbyopia (long-sightedness) which requires near vision test.

GDR-7000 system is designed to measure both near and far vision. If the [F/N] or [ADD] button is pressed, changing mode and tilting by Digital Refractor for measuring near vision occur automatically. In case of near vision, it is expected that the age and the ordinary near working distance of the patient are to set exactly because personal correction should be made by both of them. The near working distance is the ordinary distance for reading books or watching TV and the age determines the flexibility of the crystalline. Entering near working distance mode by the [F/N] button and doing so by the [ADD] button make some difference. This changes into near mode thoroughly and that only imitates mode for adjusting the feature, it will be recommended that using the [ADD] button to enter [ADD] mode if there is near-sightedness regardless of long-sightedness.

PD 64.0		SUBJ	
R	[ADD]		L
0.00	S	0.00	
- 0.25	C	- 0.50	
0	A	170	
<b>+0.50</b>	ADD	<b>+0.50</b>	
VA			



[F4](WD) and [F5](AGE) buttons will be shown in function button area(bottom of the LCD screen) when you enter the near vision mode (including [ADD] mode). At this moment, if the [SHIFT] button is pressed, basic WD(Working Distance) values 35, 40, 50, 60 and 70cm will be displayed on the screen. Set relatively large value for average western people who usually have long arm, otherwise small value for eastern people. [F4] is also provided for direct minute input. You can make a choice under your condition. Age data can be inputted after the [F5] button is pressed. GDR-7000 system also provides automatic increase and decrease of the tilting angle, which result in saving of measurement time.

After entering the near vision mode (including [ADD] mode), you measure how



much degree your patient can see the chart by lowering the rod with near distance chart. Additional spherical power can also be inserted necessary.



## 5. Co-operation with Other Instruments

GDR-7000 system can connect various kinds of optical instruments into a single network. If you have finished all the necessary mechanical network settings already, let's think about the data transfer method from the software point of view. Fortunately, GDR-7000 system helps the connection with the following instruments.

- Chart Projector
- Dream Chart
- Auto Refractometer
- Auto Lensmeter:
- 

We will describe the setting of the options first and then introduce how to load data at the end of this chapter.

### 5.1 Setting Chart Project Option

Either chart project or Dream Chart (or both of them) should be installed for full use of GDR-7000 system. We explain here what will be changed in system configuration when installing chart project.

System option for chart project are as follows:

#### (7/7) EXTERNAL INSTRUMENTS

- Chart connection -> SERIAL: Always SERIAL. There is no version with which you can directly connect to IR in GCP-7000. This option is automatically set as SERIAL if "Chart Device" option is changed to GCP-7000
- Chart Device -> GCP-7000: Always GCP-7000.
- Control-Type -> OP-xA(DEC): selects proper value according to your chart type. For example, OP-xA(DEC) type for KOREAN user's exclusive version.

To set the above system options, enter [MENU] -> "system Config" and move to page7. After setting, press the [F6] button to save your configuration and exit setup.

It will be helpful to press one of the chart buttons for simple operation test.

7/7 EXTERNAL INSTRUMENT			
MRK: Copy kerato	YES	NO	
CLM:Copy	YES	NO	NO
CLM:Copy ADD	YES	NO	
Chart Connection	SERIAL	IR	NONE
Chart Device	CCP-3100		
Controller Type	OP-xA(DEC)		
Reset Type On Clear	SOFT RESET	HARD RESET	
Installation Type	STAND ALONE	NETWORKED	
<div> <div>BACK</div> <div>NEXT</div> <div>RESET</div> <div>OK</div> <div>CANCEL</div> </div>			

## 5.2 Setting Dream Chart Option

As the above statement, either chart project or dream chart (or both of them) should be installed for full use of GDR-7000 system. This time, we explain which system configuration will be changed when installing dream chart.

System option for dream chart are as follows:

### A. Chart Proctor

#### (7/7) EXTERNAL INSTRUMENTS

- Chart Connection -> IR: Always IR. There is no version with which you can connect directly to SERIAL in space saving chart. This option is automatically set as IR if "Chart Device" option is changed to CDC-3000 v1.0x or CDC-3000 v1.1.
- Chart Device -> CDC-3000 v1.0x or CDC-3000 v1.1: Trivial mistakes can occur frequently at this point. It is necessary to confirm whether space saving charts are an upgraded model for CDR (v1.1) or net (v1.0).
- Controller-Type -> OP-xA(DEC): selects proper value according to Chart type.

7/7 EXTERNAL INSTRUMENT		
MRK: Copy karato	YES	NO
CLM:Copy/d	YES	NO
CLM:Copy ADD	YES	NO
Chart Connection	SERIAL	IR NONE
Chart Device	[CDC-3000 v1.1]	
Controller Type	OP-xA(DEC)	
Reset Type On Clear	SOFT RESET	HARD RESET
Installation Type	STAND ALONE	NETWORKED
<input type="button" value="BACK"/> <input type="button" value="NEXT"/> <input type="button" value="RESET"/> <input type="button" value="OK"/> <input type="button" value="CANCEL"/>		

## B. CDC-4000 model

### (7/7) EXTERNAL INSTRUMENTS

- Chart Connection -> SERIAL: Always SERIAL. There is no version with which you can connect directly to IR in space saving chart. This option is automatically set as IR if "Chart Device" option is changed to space saving chart.
- Chart Device -> Space saving chart or chart projector
- Controller-Type -> OP-xA(DEC): selects proper value according to Chart type.

To set the above-mentioned system option, enter [MENU] -> [System Config] and then move to page7. After setting, press the [F6] button to save your configuration and exit setup. It will be helpful to press one of the chart buttons for simple operation test.

7/7 EXTERNAL INSTRUMENT		
MRK: Copy karato	YES	NO
CLM:Copy/d	YES	NO
CLM:Copy ADD	YES	NO
Chart Connection	SERIAL	IR NONE
Chart Device	[CDC-4000]	
Controller Type	OP-xA(DEC)	
Reset Type On Clear	SOFT RESET	HARD RESET
Installation Type	STAND ALONE	NETWORKED
<input type="button" value="BACK"/> <input type="button" value="NEXT"/> <input type="button" value="RESET"/> <input type="button" value="OK"/> <input type="button" value="CANCEL"/>		

5.3 Setting RK Option

First of all, make sure that the baud rate in RK system configuration is set to 9600 in case that you have installed RK series. We recommend you to refer to the RK manual for details. Thus, the setting of GDR-7000 system is described only.

System option for RK are as follows:

(7/7) EXTERNAL INSTRUMENTS

- RK: Copy Kerato -> YES: Generally YES, which determines whether GDR-7000 receives the kerato data or not.

To set the above-mentioned system option, enter [MENU] -> “System Config” and then move to page7. After setting, press [F6] button to save your configuration and exit setup.

7/7 EXTERNAL INSTRUMENT			
MRK: Copy kerato		YES	NO
CLM:Copy ↙	YES	NO	NO
CLM:Copy ADD	YES	NO	
Chart Connection	SERIAL	IR	NONE
Chart Device	CCP-3100		
Controller Type	OP-xA(DEC)		
Reset Type On Clear	SOFT RESET	HARD RESET	
Installation Type	STAND ALONE	NETWORKED	
BACK		NEXT	RESET OK CANCEL

## 5.4 Setting LM Option

First of all, make sure that the baud rate in LM/LMP system configuration is set to 9600 in case that you have installed LM series. We recommend you to refer to the LM manual for details. Thus, the setting of GDR-7000 system is described only.

System option for LM are as follows:

### (7/7) EXTERNAL INSTRUMENTS

- **LM: Copy  $\Delta$  NO:** Generally NO, which determines whether GDR-7000 receives the prism value or not.
- **LM: Copy ADD NO:** Generally NO, which determines whether GDR-7000 receives the additional power value or not.

To set the above-mentioned system option, enter [MENU] -> "System Config" and then move to page7. After setting, press the [F6] button to save your configuration and exit setup.

7/7 EXTERNAL INSTRUMENT		
MRK: Copy kerato	<b>YES</b>	NO
<b>CLM: Copy <math>\Delta</math></b>	YES	<b>NO</b>
<b>CLM: Copy ADD</b>	YES	<b>NO</b>
Chart Connection	SERIAL	<b>IR</b> NONE
Chart Device	<b>CCP-3100</b>	
Controller Type	<b>OP-xA(DEC)</b>	
Reset Type On Clear	<b>SOFT RESET</b>	HARD RESET
Installation Type	<b>STAND ALONE</b>	NETWORKED
<b>BACK</b> <b>NEXT</b> <b>RESET</b> <b>OK</b> <b>CANCEL</b>		

### 5.5 Loading Data From RK and LM

Here is how to transfer data from RK and LM to GDR-7000 system and load them into the specific mode. It is recommended for you to refer to 4.1 for mode description.

After measuring the patient's eyes or glasses with RK or LM in advance, press the [PRINT] button in RK or LM to print the measured result. There is no and simultaneously after printing in RK or LM. Of course, connecting networks and setting proper configuration option precedes all these procedure.

The transferred data to GDR-7000 system will be queued in regular sequence and the received data list up to now can be verified by selecting LM and RK in "Transferred Data" item after pressing the [LOAD] button. When there is no data, if the [LM] or [RK] button is pressed or LM and RK field is selected in the "Transferred Data", there will be beep sound twice to give warning. Therefore, examine network connection in advance before sending data and then try again to press the [PRINT] button on RK or LM side one more time.

04/10	14:46
LOAD DATA	
Transferred Data	
CLM	
MRK	
Database	
SUBJ(Recent)	

When the [LM] or [RK] button is pressed or LM and RK field is selected in the "Transferred Area", there is more than one datum, data list will be popped up and the measured value will be shown on the left windows using the arrow keys and the dial to move vertically on the list. It is expected to verify the patient's ID on the printed paper from the auto refractometer or the auto lensmeter and then

pick put the desired value.

The patient's data can be chosen more exactly if you compare the list number and the printed number on paper and then validate it with the preview values. Let's select the suitable list and press the [EXE] button to reflect values to the left window. At this time, we can see that the S-C-A values including PD are set automatically to the header or the digital refractor. Using the LOAD function leads Quick examination.

If you want shortcuts such as [LOAD][LM] or [LOAD][RK], press the [LM] or [RK] button with the [SHIFT] button at the same time. And then [LM] or [RK] lists will come out straightly.

The more easy method to load from RK or LM is available. As you already have seen, GDR-7000 system supports stand alone mode. In stand lone mode, if either [RK] or [LM] button is pressed without entering "Transferred Area"(i.e. not to press [LOAD] button before), the latest transmission datum is automatically loaded. You don't need to press [LOAD], [RK], [EXE] buttons consequently.

### (7/7) EXTERNAL INSTRUMENTS

Installation Type -> STAND ALONE: You can choose one between STAND ALONE or NETWORKED.

The above system option can be set by entering [MENU] -> "System Config" and moving to page7. After setting, press the [F6] button to save the new configuration.

7/7 EXTERNAL INSTRUMENT		
MIRG Copy kerato	YES	NO
GLM Copy 1	YES	NO
GLM Copy ADD	YES	NO
Chart Connection	SERIAL	IR NONE
Chart Device	CCP-3100	
Controller Type	CP-W(DEC)	
Reset Type On Clear	SOFT RESET	HARD RESET
Installation Type	STAND ALONE NETWORKED	
<input type="button" value="BACK"/> <input type="button" value="NEXT"/> <input type="button" value="RESET"/> <input type="button" value="OK"/> <input type="button" value="CANCEL"/>		



## 5.6 Working with PC

GDR-7000 is equipped with the 'co-working with PC' function. It is possible to connect the serial port in a PC and the CAN board and send the measured data to the PC using the software CDR-MATE™. The data are printed from the printer connected to the PC or sent to the patient management system of the PC

It is recommended to set 'Print To Serial' item to YES on page6(PRINT OPTION) in system configuration and refer to the CDR-MATE user's manual for further information.

6/7 PRINT OPTION	
Print Subjective	[SUBJ & FIN ONLY] ON
Print Objective	[CLM ONLY]
Print kerato Data	YES NO
Print / Test Data	YES NO
Preview List	YES NO
Auto Clear	YES NO
Auto Save	YES NO
<b>Print To Serial</b> YES NO	
BACK NEXT RESET OK CANCEL	

## 5.7 Using Internal Database

GDR-7000 system keeps the previous patient's records up to 60 persons. After the patient's records have been printed completely on paper, it goes in the internal memory storage unit of GDR-7000 system by FIFO(First In-First Out, which means first examination data is lost first in the case of out of memory) method. If you want to retrieve patient's record, press the [LOAD] and [SUBJ] button in turn to verify the list of the patient. With the aid of patient's identifier, the desired patient's record can be easily taken out and set to lenses as if it were the data from LM or RK. After the pre-printed patient's identifier is compared, selection can be done with ease. See chapter 12, Results and Printout for checking the location of patient's identifier (the first part)

04/10	14:46
LOAD FIN(RECENT)	
P000120-0006	
P000120-0005	

However, this function is not factory default. Set 'Auto Save' to YES on page 6 in system configuration so as to save patient's record automatically after finishing printing on paper.

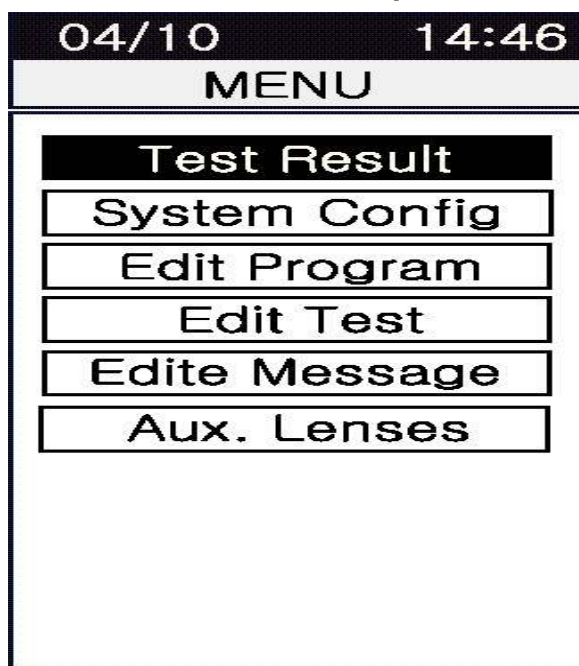
To keep the records of patients more than 60 person, use the CDR-MATE to save them using the patient management system on PC.

6/7		PRINT OPTION	
Print Subjective	[SUBJ & FIN ONLY]		
Print Objective	[CLIN ONLY]		
Print kerato Data	YES	NO	
Print Test Data	YES	NO	
Preview List	YES	NO	
Auto Clear	YES	NO	
Auto Save	YES	NO	
Print to Serial	YES	NO	
<div> <div>BACK</div> <div>NO</div> <div>RESET</div> <div>OK</div> <div>CANCEL</div> </div>			

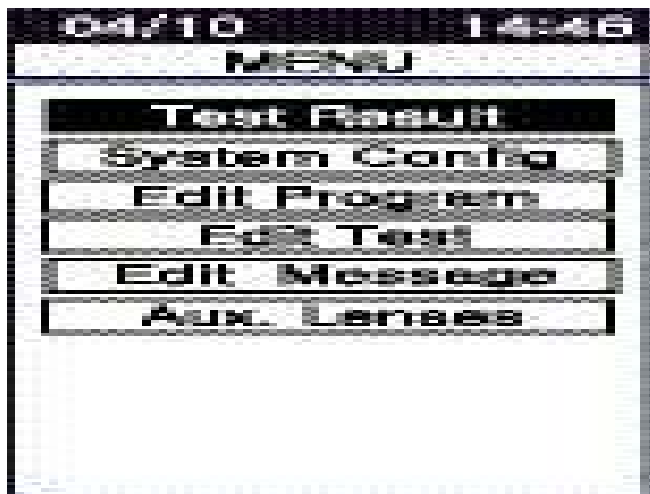
## 6. Menu Selection

GDR-7000 system supports various functions through menu selection. To select menu, just press the [MENU] button and use the arrow buttons or the dial to move and the [EXE] button to select. Menu item are as follows.

- **Test Result:** For showing the results. The results can be previewed systematically (ie. Table and graphical format) on the LCD screen before printing.
- **System config:** For the system configuration. You can set up all sorts of values related to the system.
- **Edit Program:** For adding and modifying the user-defined program(up to 10 programs).
- **Edit Test:** For adding and modifying the unit test, 1-step user-defined program that can be allocated in the chart button area( $7 * 5 = 35$  buttons).
- **Edit Message:** For editing various kinds of message used in program. You can edit the name of the user-defined program, unit test, test guide message, and the printer footer which is printed on the bottom line of printing paper.
- **Aux. Lenses:** For using the auxiliary lens explicitly. In general, pressing the chart button let the auxiliary Lens to be placed automatically, but sometimes it is required to do manually.



## 6.1 Test Result



If “Test Result” is selected (by pushing the [EXE] button after selecting the desired item), the results can be verified by five ways in each near and far mode. Toggling near or far mode can be processed using the function button, [F1]. And four table views and diagram (test frame/Keratometer Data) views can be selected.

Table view consists of four parts. List conversion is achieved applying the [F2] (LIST1), [F3] (LIST2), [F4] (LIST3) and [F5] (PRISM) buttons or turning the dial. “---” sign will be shown in the field of the table in case of no relevant data. But, if there are relevant data but the values are not yet measured, 0 or space will appear instead of “-----” sign.

Also you can change the notation of horizontal/vertical prism in the result screen.

- If you want to use X/Y, press [F6] with [SHIFT].
- If you want to use r/0, press [F7] with [SHIFT].



The following items are illustrated with the corresponding screen.

- LIST1 : S-C-A, ADD (Additional Spherical Power), VA (Visual Acuity)

ID : P020319 - 0001				PD : 64.0	
FAR		BLUR	BREAK	RECOV	Dominant Eye : R NPC : 7cm/10cm NPA OU : 33cm (2.00D) R : 33cm L : 34cm Fusion : 4 dots Stereo : YES Min. Stereo : 10° Aniseikonia : V : YES, H : NO
SUB	NRC	8.00	15.00	7.00	
	PRC	7.00	11.00	6.00	
FIN	NRC	8.00	15.00	7.00	
	PRC	7.00	11.00	6.00	
NRA	OU	+ 4.00		+ 3.50	
	R	+ 5.00	-----	+ 4.00	
	L	+ 3.75		+ 3.75	
PRA	OU	- 2.00		- 2.25	
	R	- 2.50	-----	- 2.00	
	L	- 2.00		- 2.00	

NEAR	LIST1	LIST2	LIST3	PRISM	GRAPHIC	CANCEL
------	-------	-------	-------	-------	---------	--------

- LIST2 : ADD, VA, BI/BO, BD/BU, NPC, NPA, Fusion (Worth 4 Dots), Stereo, Minute Stereo, Aniseikonia

ID : P020319 - 0001				PD : 64.0 mm	
FAR		ADD VA	BI/BO	BD/BU	Dominant Eye : R NPC : 7cm/10cm NPA OU : 33cm (3.03D) R : 3cm L : 3cm Fusion : 4 Dots Stereo : OK Min. Stereo : 10° Aniseikonia V : OK, H : NO
UA	R	120			
	L	120 120	-----	-----	
CLM	R	120	I 10.00	U 6.00	
	L	120 120	O 9.00	D 7.00	
MRK	R	120	I 10.00	U 6.00	
	L	120 120	O 9.00	D 7.00	
SUB	R	120	I 10.00	U 6.00	
	L	120 120	O 9.00	D 7.00	
FIN	R	120	I 10.00	U 6.00	
	L	120 120	O 9.00	D 7.00	

NEAR	LIST1	LIST2	LIST3	PRISM	GRAPHIC	CANCEL
------	-------	-------	-------	-------	---------	--------

- **LIST3 : BLUR, BREAK, RECOVERY, NPC, NPA, Fusion (Worth 4 Dots), Stereo, Minute Stereo, Aniseikonia**

ID : P020319 - 0001					PD : 64.0	
FAR		BLUR	BREAK	RECOV	Dominant Eye : R NPC : 7cm/10cm NPA OU : 33cm (2.00D) R : 33cm L : 34cm Fusion : 4 dots Stereo : YES Min. Stereo : 10° Aniseikonia : V : YES, H : NO	
SUB	NRC	8.00	15.00	7.00		
	PRC	7.00	11.00	6.00		
FIN	NRC	8.00	15.00	7.00		
	PRC	7.00	11.00	6.00		
NRA	OU	+ 4.00		+ 3.50		
	R	+ 5.00	-----	+ 4.00		
	L	+ 3.75		+ 3.75		
PRA	OU	- 2.00		- 2.25		
	R	- 2.50	-----	- 2.00		
	L	- 2.00		- 2.00		

NEAR	LIST1	LIST2	LIST3	PRISM	GRAPHIC	CANCEL
------	-------	-------	-------	-------	---------	--------

- **PRISM : Results of Schober, Von Graefe, Aniseikonia, Polarized Cross With the Fixation Point Test, Maddox Test, NPC and PRC Tests**

ID : P020319 - 0001			PD : 64.0 mm	
FAR	HORIZONTAL		VERTICAL	
TEST NAME	R	L	R	L
Schober	I 3.50	I 3.50	U 0.50	D 0.50
Von Graefe	I 4.50	I 4.50	U 0.70	D 0.70
Coincidence	I 4.20	I 4.20	U 0.60	D 0.60
Pola Cross	I 4.50	I 4.50	U 0.70	D 0.70
Pola Cross w/Fix	I 4.00	I 4.00	U 0.60	D 0.60
Maddox	I 4.20	I 4.20	U 0.50	D 0.60
NRC-Div.(Blur/Break/Recov)		8.00	10.00	7.00
PRC-Con.(Blur/Break/Recov)		10.00	13.00	8.00

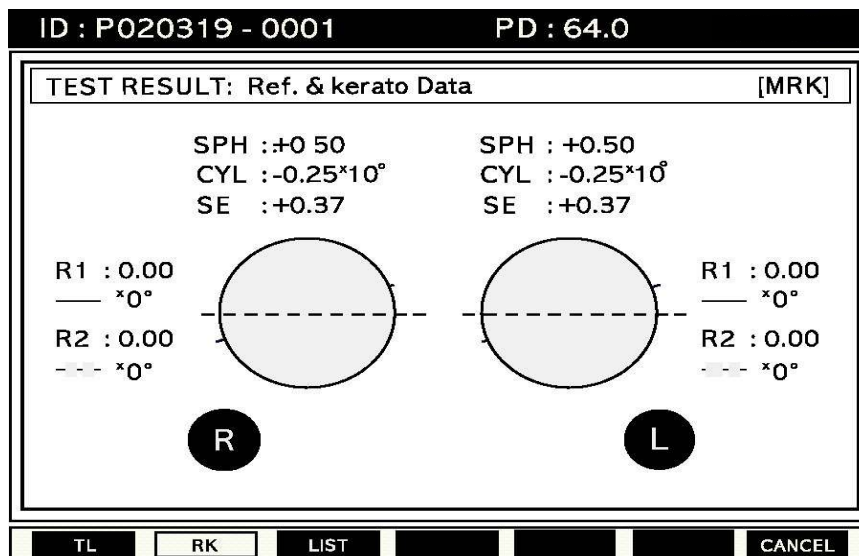
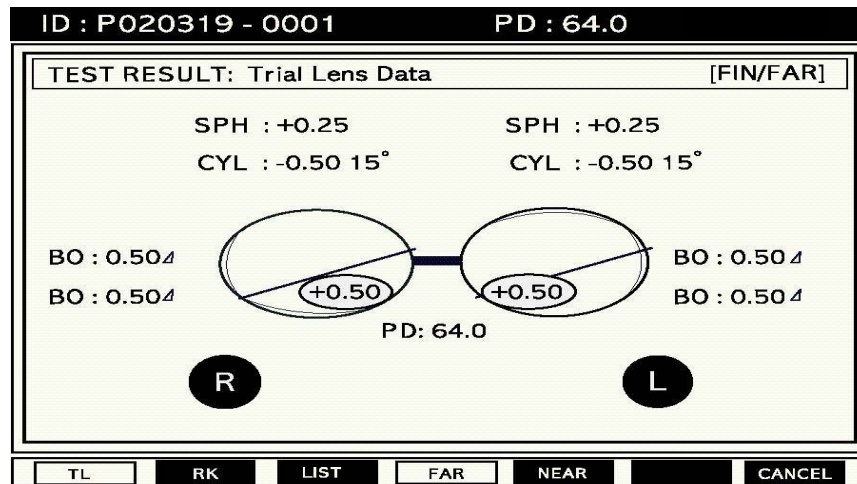
NEAR	LIST1	LIST2	LIST3	PRISM	GRAPHIC	CANCEL
------	-------	-------	-------	-------	---------	--------

**It goes through “Test Result” display in place of the direct printing on paper if “Preview List” is set as YES on page 6 of the “System Config” which appears when the [MENU] button is pressed. Set it as NO if direct printing is needed.**

Preview List	<b>YES</b>	NO
--------------	------------	----

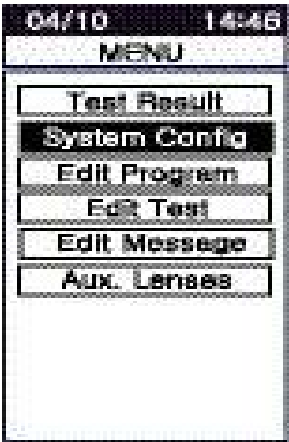
TL	RK	LIST	FAR	NEAR		CANCEL
----	----	------	-----	------	--	--------

- **Trial Lens Data:** Illustrates required information in brief to set up the trial lens. It also visually displays the S-C-A, BI/BO, BD/BU, PD values and the dominant sys.
- **Ref. & Kerato Data:** Illustrates the Ref. & Kerato Data to the screen. It also visually display the S-C-A-S.E power-R1/R2, PD values and the dominant eye.



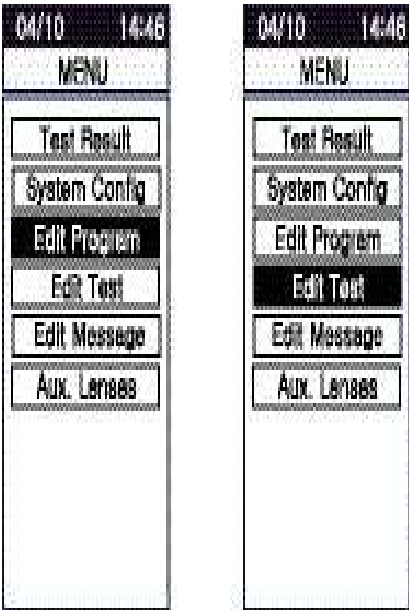


6.2 System Config



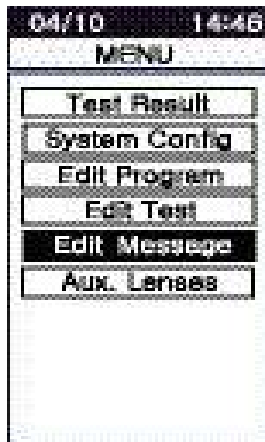
See chapter 6 for more information.

6.3 Edit program and Edit Test



See chapter 7 for more information.

## 6.4 Edit Message



See chapter 13 for more information.

## 6.5 Aux. Lenses

If “Aux. Lenses” is selected (by pressing the [EXE] button after choosing the desired item), without changing the current state, auxiliary lens can be placed in the right/left eye. Remind that if there has been auxiliary lens can be placed in the right/left eye. Remind that if there has been auxiliary lens already, another one will be placed alternatively without notice.
















Start with the right lens after entering into the initial menu. Press the [F2] button to change leftward, and [F1] to rightward. It is possible to move to another item using the arrow buttons and the dial and to another display by the [F3] (page UP) and [F4] (page DOWN) buttons. UP to 16 lenses can be chosen through 2 pages with the right/left sys. [F6] forces selected lenses placed and [F7] makes it cancel and returns to the original screen. [EXE] corresponds to [F6] and [ESC] to [F7], which makes the procedures more quick and convenient.



There is a specific case that two lenses are reversed in one line at the same time when choosing lenses. This is not a fault but a special automatic function provided by the system, which helps to select the right/left lenses for user's convenience. If you select the Polarized, Red/Green or PD Check lens, the right and left lenses will be simultaneously placed. On the other hand, lens selection might be limited according to the right and left eyes by the system features.  $10\Delta$  BI, Vertical Maddox and Red Filter can be placed exclusively in the right sys but  $6\Delta$  BU, Horizontal Maddox and Red Filter in the left eye only. The others can match for both eyes.



Table 1 shows auxiliary lenses usable with GDR-7000 system.

Lens shape	Left/Right	Description	Lens shape	Left/Right	Description
	Left/Right	Apparatus Opened		Left/Right	Apparatus Closed
	Left/Right	Polarized 45°		Left/Right	Polarized 135°
	Right	10ΔBI		Left	6ΔBU
	Right	Vertical Maddox		Left	Horizontal Maddox
	Left/Right	pinhole		Left/Right	Jackson Cross Cylinder
	Right	Red Filter		Left	Green Filter
	Left/Right	PD check		Left/Right	retinoscopic (67cm)
	Left/Right	retinoscopic (50cm)			

### ! NOTE

10ΔBI prism lens can be complemented with the prism value between 0 and 5. You may change this value in system config menu. According to this value, screen display will be changed slightly. Assign the required value in “10ΔBI complement” on Page 2 of the “System Config.” In the [MENU] then the complement value with ‘+’ sign will appear under 10Δ in the lens diagram, which can be referred to during measurement.

2/7 LENS & DATA MANIPULATION(2)		
S/C : Auto Occlusion	YES	NO
CC Type	0.25	0.50 DUAL
CC : Auto Occlusion	YES	NO
S.E. Fbx	[ CC-ONLY ]	
Retinoscopy	+1.5D	+2.0D OFF
10ΔBI Complement	[ 2 ]Δ	
Δ : Auto Occlusion	YES	NO
Link Test w/ X/Y(Δ)	YES	NO

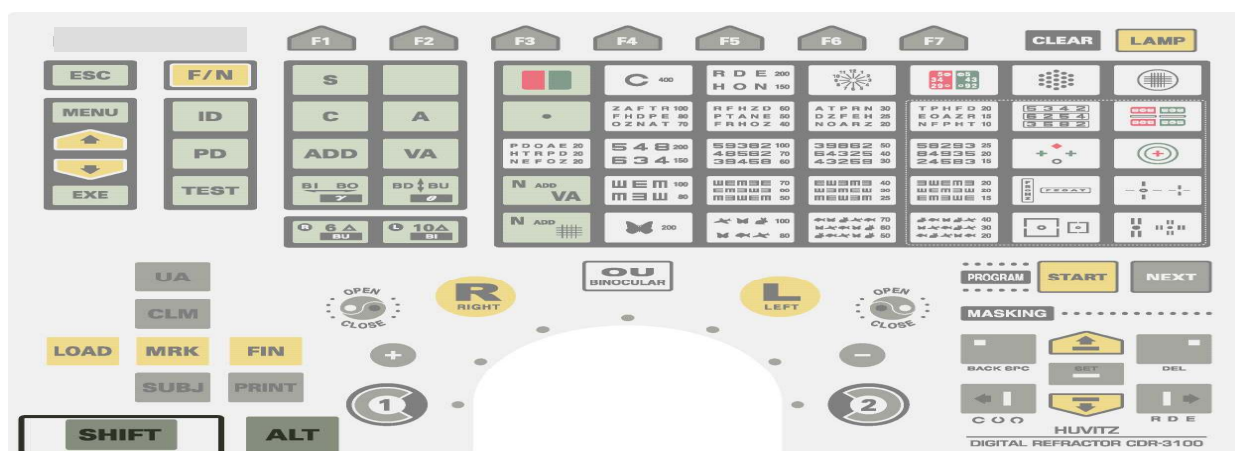
BACK NEXT RESET CLR CANCEL

PO 64.0 R  FAR  L

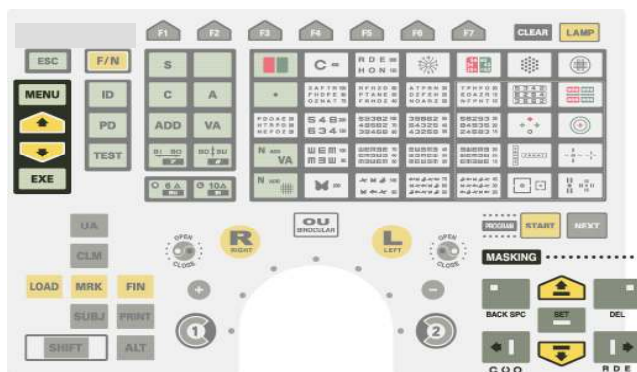
## 7. Basic Operations

GDR-7000 system is constructed to manipulate essential functions using the dial and the buttons on the operation panel. As we stated before, the operation panel is designed to divide button area into several groups and consequently you can handle it with ease. Let's examine the commonly used operation methods in advance and then explore the button descriptions with more detail manner.

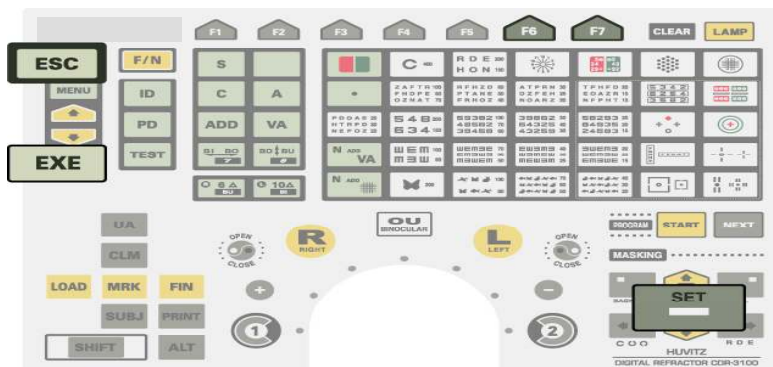
- 1) [SHIFT]/[ALT]: The [SHIFT] and [ALT] buttons play a role to logically expand the physically limited number of buttons. For example, if you want to execute the dual cross cylinder test, normally you change the "CC Type" item to DUAL in system configuration menu and then press the dots group chart button. However, here is a simple method: to push the dots group chart button and the [SHIFT] button continuously. Then the item which can be converted to DUAL will appear in the function button area. Press the [F5] and [SHIFT] buttons simultaneously to complete the DAUL cross cylinder lens setup. Also the [ALT] button is powerful for the system unit test case. In other words, instead of pressing the [TEST] and [F2] buttons annoyingly in turn to change into the user-defined test list and selecting with the dial one, the [ALT] button with user-defined buttons in the chart area combination makes the execution of the user-defined unit test possible. Like this, GDR-7000 system has arranged the function buttons very intuitively. Thus, it will be worth to try to make the [SHIFT] button with any other button combination by way of trial if necessary, case by case.



- 2) **Arrow buttons in the menu and mask area:** There are arrow buttons both in the menu and the mask area and the role of them is generally overlapped without the case of mask setting. For instance, when you are moving the cursor in system configuration, you can push either the arrow buttons in the menu or in the mask area. Likewise, either the [EXE] button in the menu or the menu or the [SET] buttons in the mask area can be pressed for setting up. Through such overlapping of the button allocation, an experienced operator in other automatic refractors from other vendors can be familiar with GDR-7000 system in a short time.



- 3) **[ESC] (Cancel), [F6] (Ok), [F7] (Cancel) and [EXE]/[SET] (Ok) buttons:** These buttons are useful if you are confused to find the exit method in certain dialog or screen. On behalf of pressing some buttons aimlessly to exit with luck, GDR-7000 system provides the [ESC] button consistently. In other words, whenever the [ESC] button is pressed, it goes to the main display without exception. GDR-7000 system provide [EXE]/[SET] button for the user confirmation. Almost every dialog box or menu selection supports [EXE]/[SET] button. Moreover, the [F6] button is allocated to Ok and the [F7] button is allocated to Cancel for convenience. Therefore, you can make use nearest or convenient one.



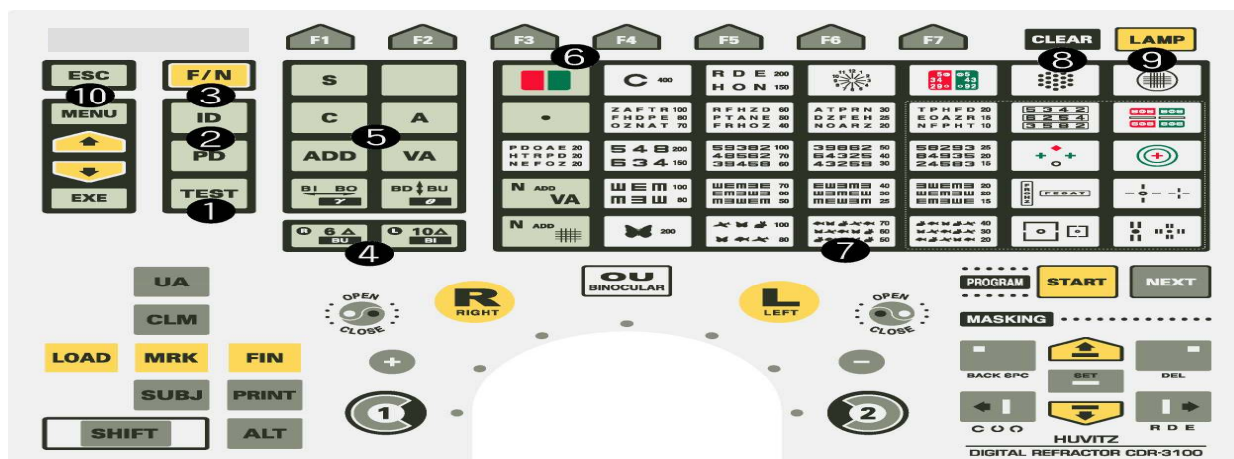
- 4) [BIBO], [BDBU] and [ADD] buttons: If these are pressed again in the PRISM (either vertical or horizontal) or ADD mode, the reversed screen is changed to square shape and the corresponding lens (rotary prism) is removed or the [ADD] mode is temporarily resolved. This function is of great use when you show your patient comparing the normal and current state.

PD 64.0	R	FAR	L	Δ OFF
0.00	S	0.00		
0.00	C	0.00		
0	A	0		
0 0.00	x↔	0 0.00		
D 0.00	y↔	U 0.00		

PD 64.0	R	FAR	L	Δ OFF
0.00	S	0.00		
0.00	C	0.00		
0	A	0		
0 0.00	x↔	0 0.00		
D 0.00	y↔	U 0.00		

PD 64.0	R	ADD	L	ADD OFF
0.00	S	0.00		
0.00	C	0.00		
0	A	0		
+1.75	ADD	+1.75		
VA				

Now, it is time when we discuss the features and functions of each button. As GDR-7000 system is made to maximize user's convenience, you have only to be fully aware of these basic descriptions to proceed into basic optometry.





### 1) Unit Test button

You can choose one among the 24 system-provided basic test or the 35 user-defined test. Press the [SHIFT] and [TEST] button at a time to enter the user-defined test display.




### 2) Patient's ID Input button

- Press the [ID] button to input the patient's ID. It is used to check the measured result.
- Press the [PD] button to enter PD control mode for both eyes and turn on the LED for VD check simultaneously.



### 3) Near/Far Vision Mode Conversion button

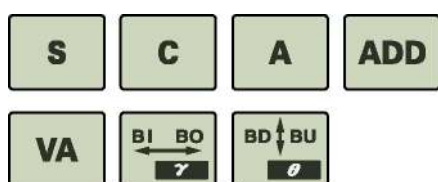
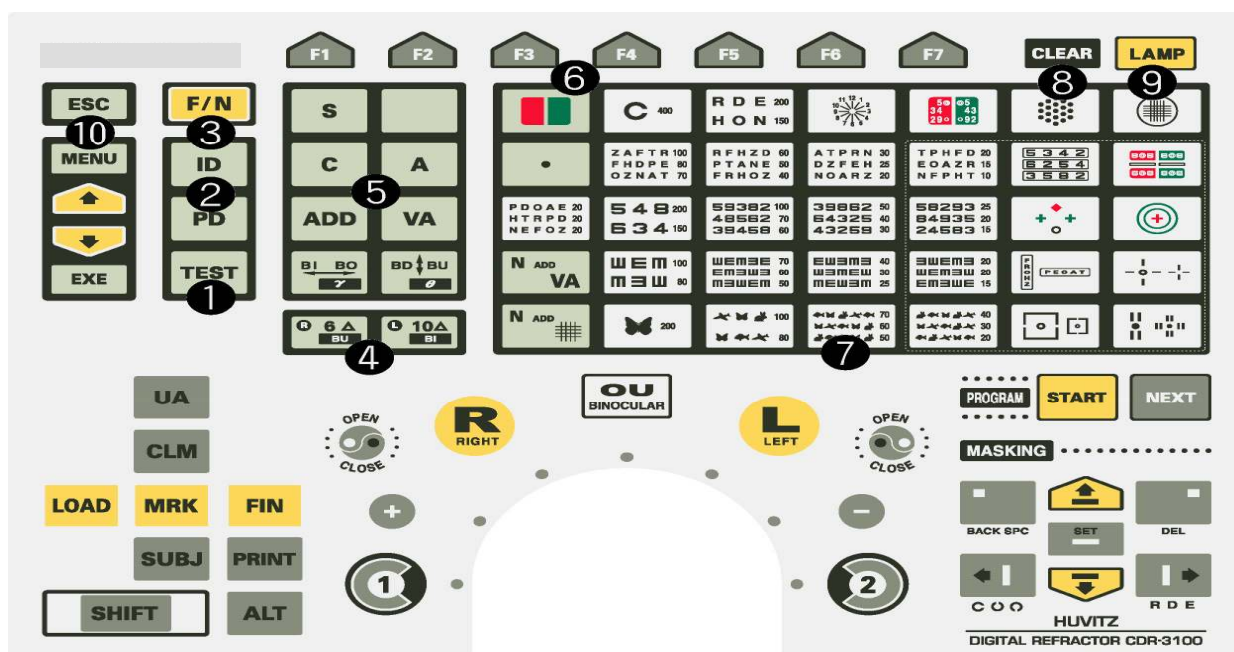
Changes the visual mode between the near and far. (The header of the digital refractor will be converged mechanically in case of the near working distance.)




### 4) Dissociative Prism Selection button

- Loads the 6  $\Delta$  base-up prism for the right eye
- Loads the 10  $\Delta$  base-in prism for the left eye (base-in prism can be complemented from 0  $\Delta$  up to 5  $\Delta$ . You may change this value in the system option value).





### 5) Data Item Selection buttons

- S: Spherical power – VA: Visual Acuity – C: Cylindrical Power – BIBO: Horizontal Prism
- A: Cylinder Axis – BDBU: Vertical Prism – ADD: Additional Power

(TIP) Pressing the [ALT] and [C] buttons at the same time convert '+' sign to '-'. On the other hand, pressing with the [SHIFT] button initializes the corresponding field to zero (for the right, left, and both eyes(especially for VA)).



### 6) Buttons for Function Key

- execute or select the function keys in the bottom area of the LCD display.
- Are useful to modify increment unit for the SPH/CYL/AXIS value.
- Execute required instructions on doing job such as program/message editing or printing.



### 7) Buttons for the Unit Test

- Execute unit test.
- Execute another test assigned to the button if pressed with the [SHIFT] button. (For example, Von Graefe, Cross Hair, Aniseikonia, and Stereo Test).
- Do the user-defined test if pressed with the [ALT] button.
- To unlink VA charts (i.e. only chart is displayed, and other functions related with VA chart are disabled), press VA chart with [SHIFT] button.

### 8) Data Clear button(CLEAR) ([SHIFT])

- Removes the field data partly or entirely. And initialize Digital Refractor.
- Initializes only the contents on the current mode if pressed with the [SHIFT] button.

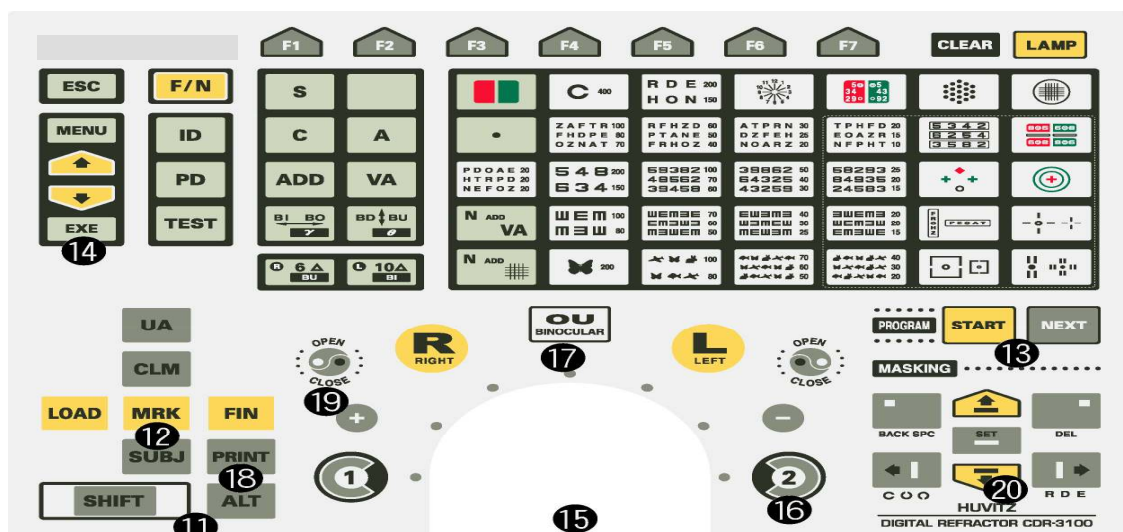
(TIP) You may change the behavior of CLEAR button as either SOFT or DARD in the system configuration menu.

### 9) LAMP button (LAMP)

- To turn off the LAMP of the chart device.
- To turn off the Backlight of the Operation Panel

### 10) Escape button (ESC)

- Returns to the main display after escaping from the current menu.
- In most situation, works as the [F6] button.



### 11) SHIFT/ALT button

- Changes the property of the button to be pressed with or the dial to be turned.



### 12) Load and Mode Selection buttons

- Receives data from the RK/LM by pressing the [LOAD] button.
- Changes mode by pressing the following buttons.
- [UA]: unaided visual acuity mode
- [LM]: LM mode
- [RK]: RK mode
- [SUBJ]: SUBJ (Subjective) mode
- [FIN]: final prescription mode
- Press the corresponding button with [SHIFT] if you are to change mode and load data simultaneously.

In the standalone system, if either [RK] or [LM] button is pressed, the latest transmission datum is automatically loaded.



### 13) Program Execution button

- Executes the standard program.
- Executes the user-defined program up to 10 by using both [SHIFT] and [START] buttons.
- Moves to the next inspection if pressed with the [NEXT] button.
- Returns to the previous inspection if pressed with both [SHIFT] and [NEXT] button.



### 14) Menu Selection and Execution buttons

- Displays the measured results.
- Sets up system configurations.
- Edits the user-defined program, unit test and messages.
- Inserts the auxiliary lenses in the Digital Refractor.
- The role of the [EXE] button is the same as the [Ok] button.



### 15) Data Modification buttons and Dial

- Changes the field(s) value selected by step unit



### 16) Jackson Cross Cylinder Manipulation buttons

- Flips the cross cylinder on the Jackson Cross Cylinder Test.



### 17) Eye selection buttons

- Selection eye to inspect.
- To set the dominant eye, press [SHIFT] + [R] (Right eye) or [SHIFT] + [L] (Left eye)


**18) Print button**

- Prints the measured results.
- Also print the results from other instruments if appropriate system option is set.
- Setting appropriate system option, determine whether the results are cleared or store after printing.
- Memorizes patient's record by option up to 60 after printing.

**19) Open/Close the test window buttons**

- Opens or closes the test window
- For the pinhole test, press the [SHIFT] button and the [OPEN]/[CLOSE] (left) for [L] or [OPEN]/[CLOSE] (right) for [R] button at the same time.

**20) Chart Mask buttons**

- Masks the chart in a vertical/horizontal/dot unit.
- Moves the mask right, left, up and down.
- Can be used as the button for the cursor movement in configuration menu.
- [ALT] + [||>] falls into Landolt Ring support mode.
- [ALT] + [<||] falls into Snellen Letter support mode.



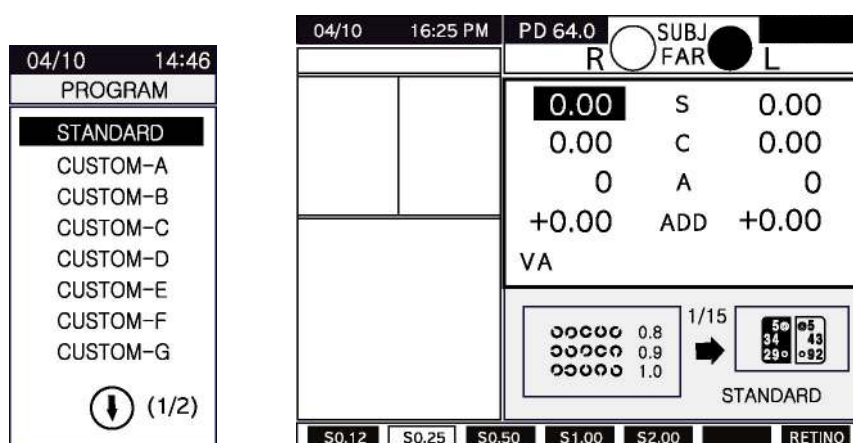
**NOTE**  
Landolt Ring/Snellen Letter Conversion function can be available only with GCP-7000.

## 8. Standard Program & Functions

GDR-7000 system provides one system-defined basic program and 10 user-defined programs to make optometry process more convenient and fast. By the system –defined program, operators can enjoy the various inspections provided with GDR-7000 system. Accordingly, this chapter explains the basic recipes for how to use GDR-7000 system and program execution methods by exploring the system-defined program carefully from beginning to end. See chapter 11 Unit Test, for detailed procedures and notice.

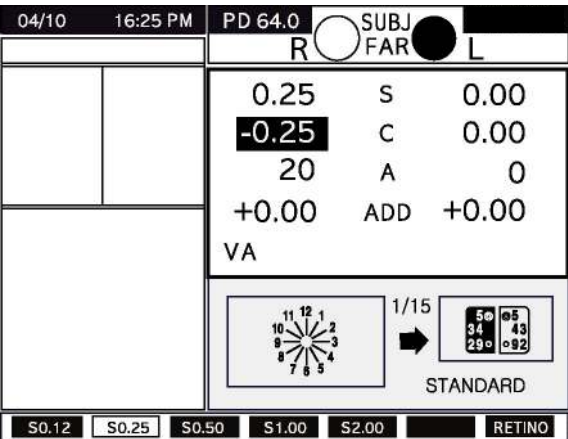
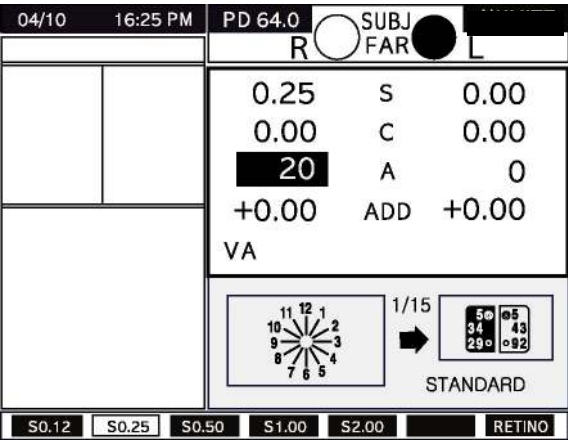
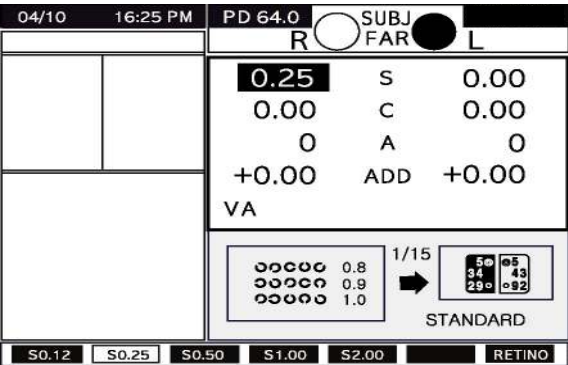
### 8.1 Starting the System Providing Basic Program

Users should wait until finishing the GDR-7000 system initialization after power recycling. For convenience's sake, let's begin after changing into the [SUBJ] mode when entering into the main screen. Press the [START] button to execute the system-defined program. If the [STSRT] and [SHIFT] button are pressed all together, program selection menu will be popped up on the left side. In this menu, you may execute the same system defined program if you choose STANDARD and then press [EXE] button. After the system-defined program begins, "STANDARD", the name of the progressing program and "1/15", the current step/the number of the whole steps of the program will be displayed at the bottom of the right window to inform the current state.



8.1.1 Right Adjustment of the SPH-CYL-AXIS Values

The first step for the system-defined program is to coordinate the SPH-CYL-AXIS values for the right eye. Initial field value is adjusted to SPH for both eyes. Push the [R] or [L] button to enter monocular test mode and then modify SPH according to the patient’s condition. Operator can take the next step if all the adjustment has been finished and the patient’s monocular visual acuity is matched for the best.



### 8.1.2 Right Red-Green Test

The second step is to calibrate the SPH value minutely for the right eye on the base of the resultant the SPH-CYL-AXIS values from step 1. First, ask your patient on which background he/she can see the letters more clearly, the green background or the red one. If green, turn the dial to the '+' direction (counter-clockwise) as it is over-corrected, and otherwise, to the '-' direction (clockwise) as it is under-corrected. Repeat this procedure until letters on both green and red backgrounds appear equal. See 11.3, Monocular Red/Green Test.

04/10 16:25 PM		PD 64.0		SUBJ		R		L	
				0.25		S		0.00	
				-0.25		C		0.00	
				20		A		0	
				+0.00		ADD		+0.00	
				VA					
 Red/ Green		 2/15		 STANDARD					
S0.12		S0.25		S0.50		S1.00		S2.00	
								RETINO	

### 8.1.3. Right Jackson Cross Cylinder Test Using the Dot Chart (AXIS)

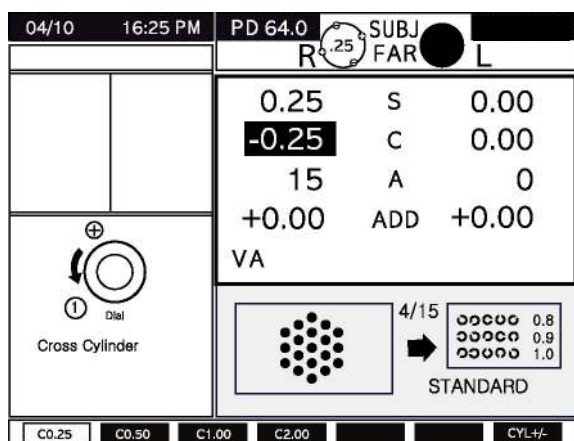
The third step is to calibrate the AXIS value for the right eye minutely on the base of the resultant SPH-CYL-AXIS values from step 1. Pressing the [1] and [2] buttons one after another during Jackson Cross Cylinder Test, ask which one appears more clear. If [1], turn the dial to the '+' direction (counter-clockwise) and if [2], to the '-' direction (clockwise). Repeat this procedure until there is no difference between [1] and [2] cases. See 11.1, Cylinder Axis Test.

04/10 16:25 PM		PD 64.0		SUBJ		R		L	
				0.25		S		0.00	
				-0.25		C		0.00	
				20		A		0	
				+0.00		ADD		+0.00	
				VA					
 Cross Cylinder		 3/15		 STANDARD					
A 1		A 5		A 15		0°		45°	
								90°	
								A135°	



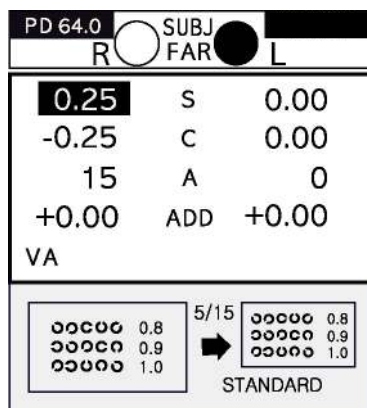
### 8.1.4 Right Jackson Cross Cylinder Test Using the dot Chart (CYL)

The fourth step is to calibrate the CYL value for the right eye minutely on the base of the resultant SPH-CYL-AXIS values from step 1. Pressing the [1] and [2] buttons one after another during the Jackson Cross Cylinder Test, ask which one appears more clear. If [1], turn the dial to the '+' direction (counter-clockwise) and if [2], to the '-' direction (clockwise). Repeat this process until the answer is there is no difference between [1] and [2] cases. See 11.2, Cylinder Power Test.



### 8.1.5 Verifying the Right Spherical Power

Now, we finished the monocular test for the right eye, verify the right spherical power one more time. Use mask for the foregoing inspection if necessary.



#### **8.1.6 Adjustment of the Left SPH-CYL-AXIS Values**

The sixth step is to coordinate the SPH-CYL-AXIS values for the left eye. See 8.1.1, Right Adjustment of the SPH-CYL-AXIS Values.

#### **8.1.7 Left Red-Green Test**

The seventh Step is to calibrate the SPH value minutely for the left eye on the base of the resultant SPH-CYL-AXIS values from step 6. See 8.1.2 Right Red-Green Test.

#### **8.1.8 Left Jackson Cross Cylinder Test Using the Dot Chart (AXIS)**

The eighth Step is to calibrate minutely the AXIS value for left eye on the base of the resultant SPH-CYL-AXIS value from step 6 see 8.1.3, Right Jackson Cross Cylinder Test Using Dot Chart (AXIS).

#### **8.1.9 Left Jackson Cross Cylinder Test Using the Dot Chart (CYL)**

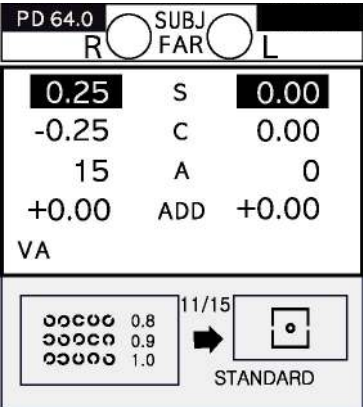
The ninth Step is to calibrate the CYL value minutely for the left eye on the base of the resultant SPH-CYL-AXIS value from step 6. See 8.1.4, Right Jackson Cross Cylinder Test Using the Dot chart (CYL).

#### **8.1.10 Verifying the Left Spherical Power**

Now, we finished the monocular test for the left eye, verify right spherical power one more time. Use mask for foregoing inspection if necessary.

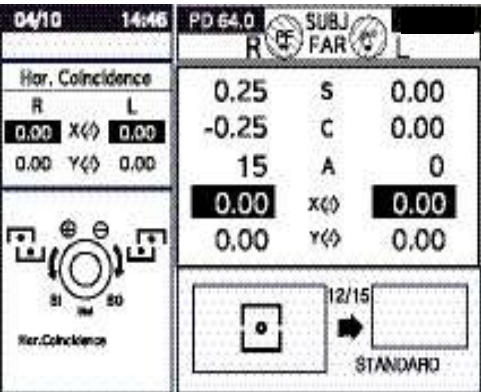
#### **8.1.11 Verifying the Binocular Spherical Power**

Now, we finished the monocular test for both eyes, verify the right and left spherical power one more time. Use mask for the foregoing inspection if necessary.



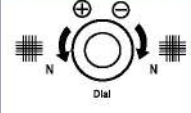

8.1.12 Far Distance Horizontal/Vertical Coincidence Test

It performs an inspection using the horizontal and vertical coincidence chart among the binocular tests. According to the guide, execute the phoria and the coincidence test (optional) and then record the test results. See 11.16, Horizontal Coincidence Test and 11.17, Vertical Coincidence Test for further information.



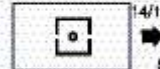
### 8.1.13 Near Distance Cross Grid Test

It checks the Cross Grid Accommodation in near mode. According to the guide increase or decrease the ADD value. See 11.29, Near Distance Additional Spherical Power Test Using the Cross Grid

04/10	14:46	PD 64.0	SUBJ	
		R	CC	L
		0.25	S	0.00
		-0.25	C	0.00
		15	A	0
		+0.00	ADD	+0.00
		VA		
 Near Cross Grid		 STANDARD		
NRA	PRA	WD	AGE	S0.25 S0.50

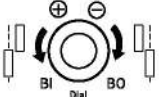
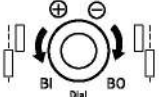
### 8.11.14 Near Vision with Additional Spherical Power Test

It performs the Near VA with ADD test. See 11.28, Near Visual Acuity with Additional Spherical Power Test

PD 64.0	SUBJ	NUVITZ
R	FAR	L
0.25	S	0.00
-0.25	C	0.00
15	A	0
+0.00	ADD	+0.00
ADD	VA	
 STANDARD		

8.1.15 Near Distance Horizontal/Vertical Von Graefe Test

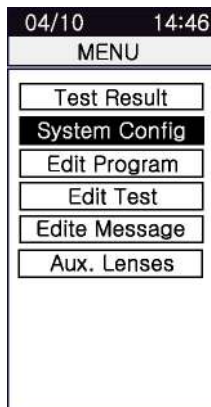
It performs Near Distance Horizontal and Vertical Von Graefe Test. According to the guide, do the phoria test. See 11.14, horizontal Von Graefe Test and 11.15, Vertical Von Graefe Test

04/10    14:46		PD 64.0		SUBJ	
		R		NEAR	
Hor. Von Graefe					
R	L				
0.00	X<A>	0.00			
0.00	Y<A>	0.00			
		Hor. Von Graefe			
		0.25	S	0.00	
		-0.25	C	0.00	
		15	A	0	
		0.00	X<A>	0.00	
		0.00	Y<A>	0.00	
					
		15/15			
		The End			
		STANDARD			
		P0.1    P0.2    P0.5    OK    CANCEL			

Now, we have completed the standard tests including monocular correction (right) -> monocular correction (left) -> binocular test -> Binocular Vision Function Test -> near distance test.

## 9. Configurations

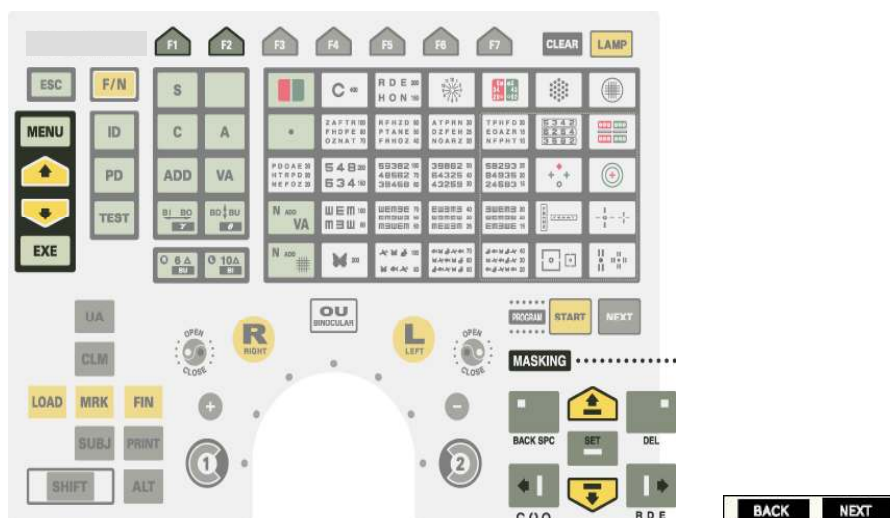
GDR-7000 system provides various kinds of system configuration menu and thus it is able to optimize optometry environment. You may start configuration by pressing the [MENU] button. Then selects “System Config” and finally press the [EXE] button. It is composed of 7 pages and the major categories are as follows: “LENS MANIPULATION (1,2), “TEST & DATA MANIPULATION (1,2)”. Before exploring configuration by page sequence all around, button method is covered.



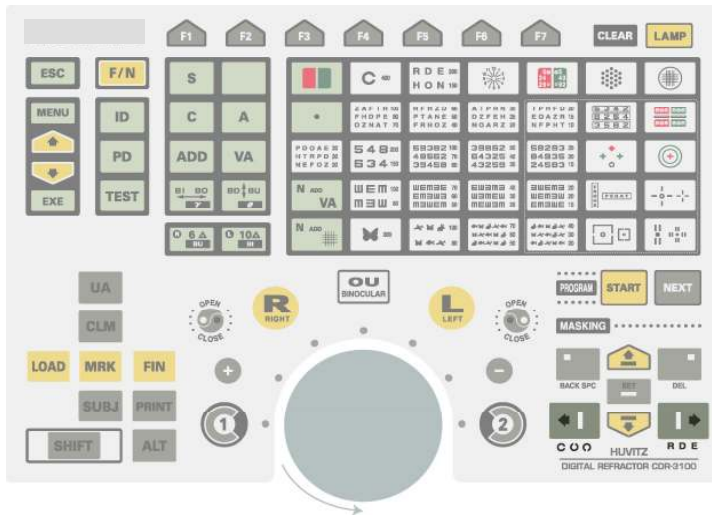
### 9.1 Button operations

Button operations for system configuration are introduced briefly.

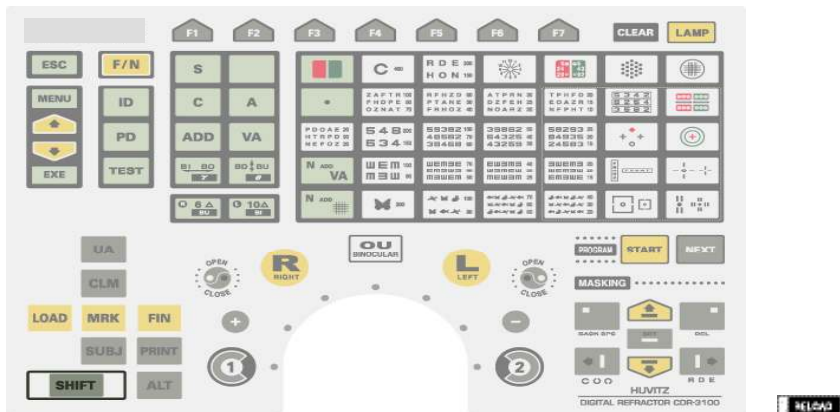
- Moving: [F1] (backward) and [F2] (forward) buttons are for moving by page. Up and Down arrow buttons in the menu and mask area are for moving by field.



- **Modifying Values:** Turn the dial or press the right and left arrow buttons in the mask area to change field value.



- **Cancel:** You can be at ease when you have made unexpected mistakes. Press [F3](RESET) button to revert to original values of current paged and [SHIFT] + [F1](REROAD) to revert to all the original values of all over the pages just before. Of course RESET and RELOAD are only applicable before saving.



- **Save and Cancel:** the [F6](OK) button is to save while the [F7](Cancel) button is to cancel.



## 9.2 Description of Options

Let's find out which options are provided by each page.

A. page 1(LENS MANIPULATION(1)): sets all kinds of lens operations.

- ① **SPH step** : sets the basic step for a SPH value. Choose one among 0.12D,0.25D and 0.50D. Default value 0.25D.
- ② **CYL Sign** : sets the basic sign for a CYL value. Either '+' or '-' sign if accepted. Default is '-'. Press the [F7] button or [ALT] + [C] to change the default sign for a short time and then the sign will be reversed(i.e + ->-,--,+ ) in moment. press the same button combination one more time to return the original sign.
- ③ **AXS Step** : sets the basic step for a AXIS value. Choose one among 1°, 5°and 15°. Default value is 5°.
- ④ **Δ Step** :sets the basic step for a prism value. Choose one among 0.1Δ ,0.2 Δ and 0.5Δ. Default value is 0.5Δ.
- ⑤ **SPH Step[SHIFT]**: sets the basic step for a SPH value when the [SHIF]button is pressed. Choose one among 1.00D,2.00D and 3.00D.Default value is 1.00D Try turning the dial while pressing the [SHIFT]button to make use of this option.
- ⑥ **CYL Step[SHIFT]**: set the basic step for a CYL value when the [SHLFT] button is pressed. Choose one among 1.00D,2.00D and 3.00D. Default value is 1.00D.Try turning the dial while pressing the [SHIFT]button to make use of this option.
- ⑦ **AXS Step [SHIFT]** : sets the basic step for a AXIS value when the [SHIFT]button is pressed. Choose one among 1°,5° and 15°. Default value is 1°. Try turning the dial while pressing the [SHIFT] button to make use of this option.
- ⑧ **Δ Step [SHIFT]** :sets the basic step for a prism value when the [SHIFT] button is pressed, Choose one among 0.5Δ,1.0Δ and 2.0Δ. Default value is 1.0Δ.Try is pressed . Choose one among 0.5Δ,10Δ and 2.0Δ. Default value is 1.0Δ. Try turning the dial while pressing the [SHIFT] button to make use of this option.

1/7 LENS & DATA MANIPULATION(1)			
SPH Step	0.12D	0.25D	0.50D
CYL Sign	[ - ]	[ + ]	
AXS Step	1°	5°	15°
ΔStep	0.1Δ	0.2	0.5 Δ
SPH Step [shift]	1.00D	2.00D	3.00D
CYL Step [shift]	1.00D	2.00D	3.00D
AXS Step [shift]	1°	5°	15
ΔStep [shift]	0.5Δ	1.0 Δ	2.0 Δ
<div> <div>BACK</div> <div>NEXT</div> <div>RESET</div> <div>OK</div> <div>CANCEL</div> </div>			



**B. Page 2 [LENS MANIPULATION (1)]:** Sets all kinds of lens operations.  
Continued from page 1.

- ① **S.C :Auto Occlusion** : assigns YES or NO whether auto occluding for patients will be executed when the SPH and CYL lenses are changed rapidly. Default value is YES.
- ② **CC Type** : assigns the type for the Cross Cylinder 0.25,0.50 fir DUAL can be selected, 0.35 and 0.5 are for the Jackson Cross Cylinder and DUAL is for the Dual Cylinder. Default value is 0.25(for the Jackson Cross Cylinder).
- ③ **C.C: Auto Occlusion** : assigns YES or NO whether auto occluding for patients will be executed when the Cross Cylinder lens is changed rapidly. Default value is YES.
- ④ **S.E. Fix** : specifies whether spherical equivalent power will be fixed or not. Choose one among CC-ONLY (for CROSS CYLINDER only), CYL MODE(for CYK mode only), OFF (turning off both CC and CYL) and ALWAYS(turning on both CC and CYL). Default value is CC-ONLY.
- ⑤ **Retinoscope** : assigns kind of retinoscopic lenses. Select one among =1.5D,+2.0D and OFF. Default value I = 1.5D.
- ⑥ **10 $\Delta$ BI Complement** : assigns additional prism power up to 0~5 $\Delta$  to be placed in 10 $\Delta$ BI aux. Split prism lens. Default value is 2 $\Delta$ .this option has influence not only on lens but also on various screens showing 10 $\Delta$ BI. As a result, you can understand the current situation with ease.
- ⑦  **$\Delta$ Auto Occlusion** : assigns YES or NO whether auto occluding for patients will be executed when the prism is changed abruptly. Default value is YES.
- ⑧ **Link  $\Delta$ test w/X/Y ( $\Delta$ )**: assigns YES or NO whether the left-top prism area for phoria and right main area will be synchronized of not. Default value if NO.

2/7 LENS & DATA MANIPULATION(2)		
S.C : Auto Occlusion	YES	NO
CC Type	0.25	0.50 DUAL
CC : Auto Occlusion	YES	NO
S.E. Fix	[CC-ONLY]	
Retinoscopy	+1.50	+2.00 OFF
10 $\Delta$ BI Complement	[2] $\Delta$	
$\Delta$ : Auto Occlusion	YES	NO
Link:Test w/ X/Y( $\Delta$ )	YES	NO

BACK NEXT RESET OK CANCEL

**C. Page 3 (LENS MANIPUATION (2)) : sets all kinds of inspections and adt modifications .**

- ① **Δ Display** : assigns the notational method for prism. X/Y of r/θ can be chosen. Default value is X/Y.
- ② **Blur/Break/Recovery** : specifies whether the Blur/Break/Recovery value will be set up. YES of NO can be chose. Default value is YES.
- ③ **VA Auto Set** : assigns how to set up chart mask while inspecting Visual Acuity. POINT, ROW or OFF can be chosen, Default value is NO.
- ④ **Allow [-] Addition** : specifies whether ‘-’ additional power can be accepted or not YES of NO can be chosen, Default value is ROW.
- ⑤ **ADD Estimation** : specifies whether the Additional Spherical Power will be estimated or not YES or NO can be chosen. Default value is NO.
- ⑥ **F<->N DATA Link** :specifies how to reflect the reflect the ADD value between near and far distance. SPH =ADD adds SPH and ADD,SPH only reflects SPH, and OFF doesn’t reflect anything. Default value is OFF.
- ⑦ **Working Distance** ; assigns Working Distance from 35 to 70 cm. Default value is 40cm
- ⑧ **PD Auto Set** : assigns data source to be referred to for setting PD value. RK, CLM, or OFF can be chosen. Default value is RK.



### WARNING

It is recommended to select RK for PD state because it is easier to measure PD using RK than using CLM.

3/7 TEST & DATA MANIPULATION(1)			
ΔDisplay	X/Y	r/θ	5
Blur/Break/Recovery	YES	NO	5 ROW
VA Auto Set	POINT	ROW	OFF 10
Allow [-] Addition	YES	NO	NO 1
ADD Estimation	YES	NO	1
F <-> N Data Link	SPH+ADD	SPH	OFF
Working Distance	[ 40 ]cm	1	1
PD Auto Set	MRK	CLM	OFF

BACK	NEXT	RESET	OK	CANCEL
------	------	-------	----	--------

**D. Page 4 (LENS MANIOPULATION(2)) :** Sets all kinds of inspections and data modifications. Continued from page 3.

- ① **Default Program :** assigns basic program which is selected when the [PROGRAM] button is pressed. Headed by STANDARD, user-defined programs up to 10 can be change the working style of the [PROGRAM] button in particular.
- ② **Input Fusion :** specifies whether the results of the worth-4Dots Test will be recorded or not. YES or NO can be chosen. Default value is YES.
- ③ **Input stereo :** specifies whether the result of Stereo Test will be recorded or not. YES or NO can be chosen. Default value is YES.
- ④ **Input Coincidence :** specifies whether the result of Stereo Test will be recorded or not. YES or NO can be chosen. Default value is YES.
- ⑤ **Fog: Balance :** specifies how much fog from =0.00D to + 1.00D will be applied during the Binocular Balance Test, Default value is +0.00D.
- ⑥ **Fog : Red/Green :** specifies how much fog from +0.00D to +1.00D will be applied during the Red/Green Test. Default value is +0.00D
- ⑦ **Startup Mode :** specifies from which mode system will start when turning on the power or when the system is initialized by the [CLEAR] button. Choose one among ENPTY, UA,CLM.RK and SUBJ. Default is EMPTY. See chapter 1 for mode description.
- ⑧ **SUBJ Startup :** specifies from which code data will be copied and used when edtering the SUBJ mode by the [SUBJ] button. Choose one among CLM,RK and AAANY. Default value is ANY, see chapter 1 for mode description.

4/7 TEST & DATA MANIPULATION(2)	
Default Program	STANDARD
Input Fusion	YES NO
Input Stereo	YES NO
Input Coincidence	YES NO
Fog : Balance	[+0.00]D
Fog : Red/Green	[+0.00]D
Startup Mode	EMPTY
SUBJ Startup	CLM MRK ANY

BACK NEXT RESET OK CANCEL

**E. Page 5 (TEST ENVIRONMENT) :** Sets various environments on the operation panel itself.

- ① **Language:** specifies the language type. Only ENGLISH is supported at present.
- ② **Background Color:** specifies the background of the LCD. WHITE or BLACK can be chosen. Letter on the screen has opposite color to the background. Default value is WHITE.
- ③ **Beep Sound:** specifies whether the beep sound will be turned on or off. ON or OFF can be chosen. Default value is ON
- ④ **Screen Off:** specifies the activation idle time of the screen saver. Choose one from 0 minute (inactive) up to 1 hour at intervals of 5 minutes. Default value is 10 minutes.
- ⑤ **Test Time Start:** specifies from when the elapse of time will start to be counted. ENTERING SUBJ (when the [SUBJ] button is pressed) or BEGINNING TEST (when the test begins) can be chosen. Default value is ENTERING SUBJ.
- ⑥ **Date Display:** specifies date format shown on the left-top area display. Choose one among DD/MM hh:mi (12H), DD/MM hh:mi (24H), DD/MM, MM/DD hh:mi and MM/DD. Default value is DD/MM hh:mi (12H). As you know, DD stands for date, MM for month, hh for hour and mi for minute.
- ⑦ **DATE [YY/MM/DD]:** assigns current date. YY means years.
- ⑧ **TIME [hh/mm/ss]** assigns current hour. Ss means second.

5/7 TEST ENVIRONMENT	
Language	[ENGLISH]
Background Color	WHITE BLACK
Beep Sound	ON OFF
Screen Off	[10] min
Test Time Start	ENTERING SUBJ BEGINNING TEST
Date Display	[MM/DD hh: mi (12H)]
Date [YY/MM/DD]	[2000] [01] [23]
Time [hh/mi/ss]	[01] [11] [00]

BACK	NEXT	RESET	OK	CANCEL
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**F. Page 6 (PRINT OPTION): Sets various environments on printing**

- ① **Print subjective:** specifies items to print while printing the result of the subjective test. Choose One among All (all the data), W/O UNAIDED VA the results of the visual function test), SUBJ & FIN ONLY (showing only the SUBJ and FIN information) and OFF (without any subjective test). Default value is ALL.
- ② **Print Objective:** specifies item to print while printing the results of the subjective test. Choose one among All (all the data), [RK ONLY] (showing the RK information only), [CLM ONLY] (showing the CLM information only) and OFF (without any objective test). Default value is OFF.
- ③ **Print kerato Data:** specifies whether Kerato value will be printed or not. YES or NO can be chosen. Default value is NO.
- ④ **Print  $\Delta$ Test Data:** specifies whether the preview of the prism test for each phoria test will be printed or not. YES or NO can be chosen. Default value is NO.
- ⑤ **Preview List:** specifies whether the results will be shown or not when the [PRINT] button is pressed. YES or NO can be chosen. Default value is YES.
- ⑥ **Auto Clear:** specifies whether the test results will be initialized or not when the [PRINT] button is pressed. YES or NO can be chosen. Default values is YES.
- ⑦ **Auto Save:** specifies whether the test results will be saved or not when the [PRINT] button is pressed. YES or NO can be chosen. Default value is NO.
- ⑧ **Print To Serial:** specifies if the data is transferred to the CDR-Mate or the internal printer. YES or NO can be chosen. Default value is NO. In case that the CDR-Mate is not used, assign NO for printing by the internal printer.

6/7 PRINT OPTION	
Print Subjective	[ALL]
Print Objective	[OFF]
Print kerato Data	YES NO
Print $\Delta$ Test Data	YES NO
Preview List	YES NO
Auto Clear	YES NO
Auto Save	YES NO
Print To Serial	YES NO

BACK NEXT RESET OK CANCEL

**G. Page 7 (EXTERNAL INSTRUMENTS):** Sets various environments on external instruments.

- ① **RK: Copy Kerato:** specifies whether Prism data is transmitted from RK or not. YES or NO can be chosen. Default value is YES.
- ② **CLM: Copy  $\Delta$ :** specifies whether Prism data is transmitted from CLM or not. YES or NO can be chosen. Default value is NO.
- ③ **CLM: Copy ADD:** specifies whether ADD data is transmitted from CLM or not. YES or NO can be chosen. Default value is NO
- ④ **Chart Connection:** specifies how to deal with the chart connection. Choose one among SERIAL (serial), IR(Infrared) and NONE (without chart). Default value is SERIAL.
- ⑤ **Chart Device:** specifies the kind of the instrument. Choose chart device. Default value is GCP-7000.
- ⑥ **Controller:** specifies the type of the controller. Default is OP-xa (DEC) for Korean user. The default value may be changed for other countries.
- ⑦ **Reset Type On Clear:** specifies how to reset while cleaning. SOFT RESET or HARD RESET can be chosen. Default value is SOFT RESET. It is recommended to assign HARD RESET where the power voltage is unstable or there is much electronic noise in your inspection room so as to guarantee the reliable reset.

7/7 EXTERNAL INSTRUMENTS	
MRK: Copy kerato	<input checked="" type="radio"/> YES <input type="radio"/> NO
CLM: Copy $\Delta$	<input type="radio"/> YES <input checked="" type="radio"/> NO
CLM: Copy ADD	<input type="radio"/> YES <input checked="" type="radio"/> NO
Chart Connection	<input checked="" type="radio"/> SERIAL <input type="radio"/> IR <input type="radio"/> NONE
Chart Device	<input type="text" value="CCP-3100"/>
Controller Type	<input type="text" value="OP-xA(DEC)"/>
Reset Type On Clear	<input checked="" type="radio"/> SOFT RESET <input type="radio"/> HARD RESET
Installation Type	<input checked="" type="radio"/> STAND ALONE <input type="radio"/> NETWORKED

BACK	NEXT	RESET	OK	CANCEL
------	------	-------	----	--------

The Following table illustrates how to set the external instruments according to the kind of GCP-7000 in brief.

Chart Type	Chart Connection	Chart Device
CDC-4000	SERIAL	CDC-4000
CDC-4000	IR	CDC-4000
CCP-3100	SERIAL	GCP-7000

So far we looked around all the system options. Default values for the frequently used options are pre-defined for user's convenience. Therefore, you may make use of them without change. However, you can tune your system for your taste little by little after you be accustomed to them more or less.

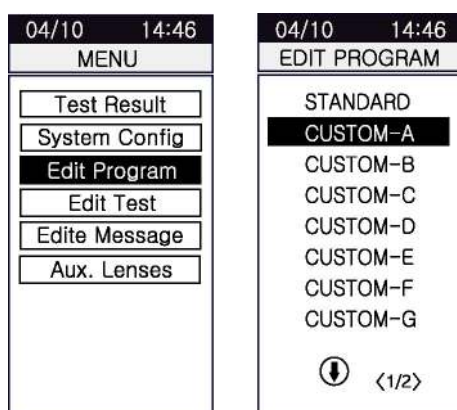
## 10. Program Editing

If user-defined programs are made matching for the doctor to use them to and the purpose of the program in advance, the training cost will be greatly reduced and the inspection will be processed more quickly. You will catch two hares at a time. Unit test can be reformed to operator 's capabilities and thus provides amazing enlargement. So you can benefit from this. For example, when using the Dual/Jackson Cross Cylinder, you can re-define familiar number chart on behalf of the boring dot chart for Unit Test.

Program Editing function is divided into two part: User-Defined Program and Unit Test Program. Since the Unit Test is thought of as a 1-step user-defined program, if you could edit user-defined program in your own way, Unit Test follows naturally. To begin with, let's start from the user-defined program.

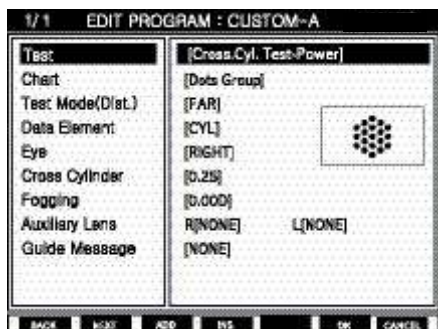
### 10.1 User-Defined Program

To edit a user-defined program, press the [menu] button first and then select "Edit Program" and finally press the [EXE] button. Then program selection display will be shown. You can here select one from 10 program (You cannot select STANDARD (i.e system defined program)). Use arrow buttons and the dial to select one (for example, CUSTOM-A) and press the button [EXE]. Now editing screen displays itself.





The number 1/1 is appeared on the left-top area in editing display. The first number stands for the current step number and the second number following “/” for the whole step numbers. For instance, if the user-defined program has 10 steps all together and the current step is the 4<sup>th</sup>, “4/10” will appear. The maximum step of user-defined program is 32.



The left window shows elements to define and the right one shows value to apply. Function buttons are located in the bottom line. The [F1] (BACK) button goes to the previous step and the [F2] (NEXT) button to the next step. The [F3] (ADD) button adds a new step behind the last one and the [F4] (INS) button insert a new step before the current one. Press the [F6] (OK) button to confirm after defining program functions through all steps. If there is need to cancel the program editing, press the [F7] (CANCEL) button. The [SHIFT] button reveals hidden options. [SHIFT] + [F1](DEL) removes the step which is begin edited. [SHIFT] + [F3](TEST) selects the Test on the left MENU window in a dialog form. Likewise, [SHIFT] + [F4] (LENS) selects auxiliary lens on the left MENU window in a dialog form. Finally, [SHIFT] + [F5](MSG) changes guide messages.

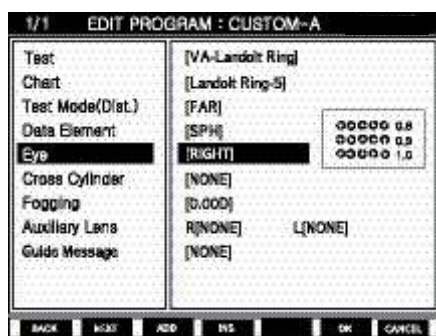


We introduce the elements of a user-defined program in the left window.

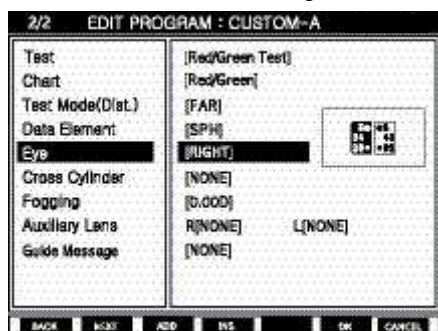
- **Test:** the name of the system test to apply. If the Test item is changed, the related Chart, Data Element, Cross Cylinder, Fogging and Auxiliary Lens items will be changed at a time if possible. To select this, press the Chart item directly, use the dial or press [SHIFT] + [F3] (TEST) and turn dial.
- **Chart:** cannot be changed directly as it is combined with the Test
- **Test Mode (Dist.):** assigns whether near or far distance. Use the [F/N] button or the dial to change near or far distance.
- **Data Element:** assigns SPH, CYL, AXS, ADD, VA, BIBO, BDBU or ADDVA. Turn the dial or press the [S], [C], [A], [ADD], [VA], [BIBO], [BDBU] or [N ADD VA] button to select this.
- **Eye:** assigns BINOCULAR, LEFT or RIGHT. Use the dial or press the [R], [OU] or [L] button to select this
- **Cross Cylinder:** assigns 0.25, 0.50 or DUAL Cross Cylinder. Use the dial to select this or press [1], [2] buttons to select this field.
- **Fogging:** assigns the mount of fogging between 0 and 1 by using the dial. (0.12D Step) Use [SHIFT]+[F6](FOG+) to plus fogging value, and [SHIFT] + [F7](FOG-) to minus fogging value.
- **Auxiliary Lens:** assigns the right and left auxiliary lenses by the dial and arrow buttons. Use the dial or press [SHIFT] + [F4] and select the lens. Also use([Open/Close]) button to select Open/occluder lens.
- **Guide Message:** specifies guide message. Use the dial or press [SHIFT] + [F5] and select the pre-edited comment.

Let's make a user-defined program similar to the system-defined program. For convenience's sake, we will confine the step: resolving S-C-A value -> Red/Green balance Test -> Cross Cylinder Test using Dots Group Chart (AXIS) -> Cross Cylinder Test using Dots Group Chart (Cylinder) -> Red/Green balance Test again.

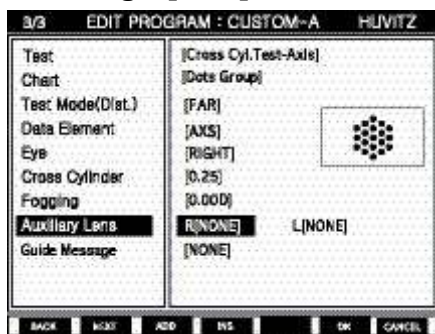
- 1) Press the Landolt Ring Chart in initial display. Then the Test item changes to [VA-Landolt Ring] and the Chart item to [Landolt-Ring-5]. Choose the Test and turn the dial to change the Test and Chart Items. The simplified method such as [TEST] or [SHIFT] + Chart is also available. If Chart is selected, choose Test Mode (Dist.) in the left window continuously and turn the dial to assign [BINOCULAR]. Notice that the Mask buttons cannot be used to move within menu after the VA Chart is selected. Instead of this, use arrow buttons under the [MENU] button to move up and down.



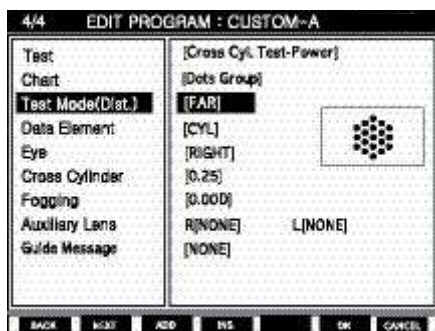
- 2) Now that the initial setting has been finished, let's start the second step. Press the [F3] button to add a new display (step) for the user-defined program. Push the Red/Green Balance Chart in this display and then the Test item will be changed to [Red/Green Test] and the Chart item to [Red/Green]. After selecting the chart, subsequently choose the Test Mode (Dist.) itm in the left window and turn the dial to assign [FAR]. Likewise, choose the Eye item and turn the dial to assign [BINOCULAR].



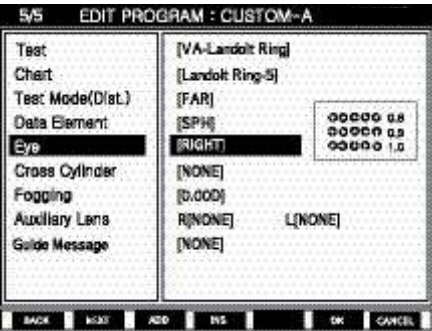
- 3) Let's enter the third step. Similarly, press the [F3] button to add the new display for the user-defined program. Push the Dots Group Chart in this display and then the Test item will be changed to [Cross Cyl. Test – AXIS] and the Chart item to [Dots Group]. After selecting the chart, subsequently choose the Test Mode (Dist.) item in the left window and turn the dial to assign [FAR]. Likewise, choose the Eye item and turn the dial to assign [RIGHT]. Afterward, select the Cross Cylinder item in the left window and assign [0.25].



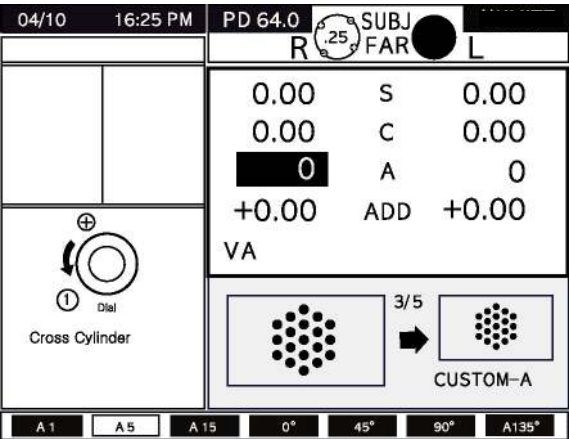
- 4) The 4<sup>th</sup> step. Also press the [F3] button to add a new display for the user-defined program. Push the Dots Group Chart in this display. Because we are planning to measure not AXIS but CYL, push the Dots Group Chart once more to change the Test item into [Cross Cyl. Test-Power] and the Chart item to [Dots Group]. At this moment, assign the Test Mode (Dist.), Eye and Cross Cylinder items like 2).



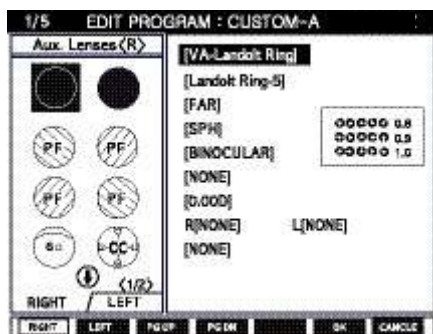
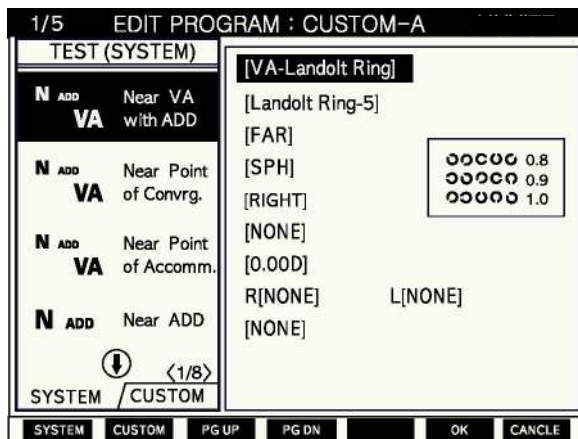
5) This is the 5<sup>th</sup> step. Repeat the procedures in 1).



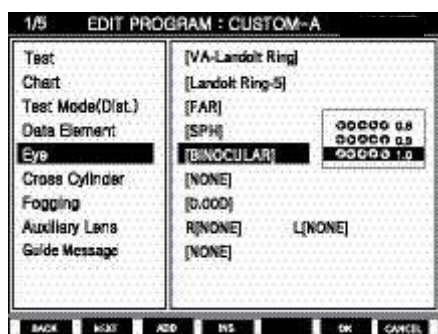
Since we have finished all steps, press [F6] to save and exit. Push [SHIFT] + [PROGRAM] to see the program list which we composed just before and choose “CUSTOM-A” to launch this program in practice.



There are some hints to be able to build a program more quickly. First one is how to select the auxiliary lens and the inspection item. After choosing the Auxiliary Lens item in the left window (R[NONE] is automatically reversed in the right window), Press [SHIFT] + [F4] and the auxiliary lens selection window that is familiar to you will be presented in the left side of the display and required lenses can be placed at a time. Choose the right side after selecting R[NONE] and the left side after selecting L[NONE] separately. Press [SHIFT] + [F3] or the [TEST] button to spread familiar system and user-defined unit test window is appeared in the left side of the display. If the required test is selected, it will be automatically reflected to the Test item. Since users can here select the Unit Test which will be introduced next time, there are various combination methods to apply to the program step.



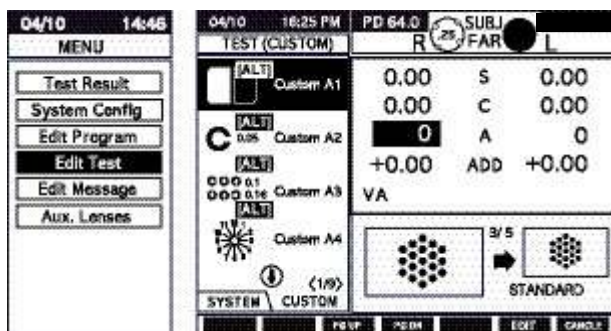
The next hint is how to apply the mask shifting button is pressed after spreading VA chart, right/left and up/down movements can be done naturally for the mask setting. The last hint is the various shortcuts. For example, if user wants to assign the left eye to the Eye item, just press the [L] button instead of turning the dial. Similarly press the [R] or the [OU] button to assign value at a time. Also, if the user want assign S to the Element item, press the [S] button. The same is true for the [C], [ADD], [VA], [BIBO] and [BDBU] buttons to assign values at a time. Also, in the FAR or NEAR mode, values can be assigned at a time using [F/N] button, For Cross Cylinder, values can be assigned at a time using [1]/[2] buttons.



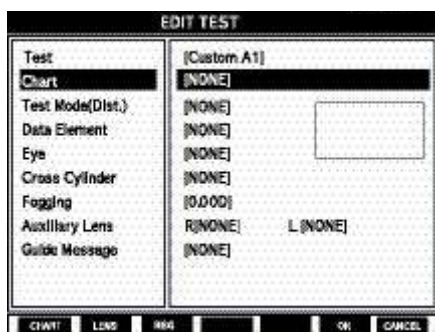
At first glance, program editing appears to be very difficult, but if you try to make use of it several times, you can find this job very easy.

## 10.2 Unit Test Program

If the user-defined program can be understood as it is, the Unit Test program is not so hard. After pressing the [MENU] button and select “Edit Test” and then press the [EXE] button to enter the Unit Test program editing function. Now selecting the Unit Test program window will be popped up on the left side. Each item presented here is displayed as the button in chart key area and it means the 1-step unit program which will be execute when the defined button is pressed with [ALT]. Since the chart key area includes  $5 \times 7 = 35$  keys, total 35 unit programs can be defined. Let’s define a Unit Test for the Red/Green filter, “Custom A1” first, for an example.



If “CUSTOM-A” is selected, the display similar to the user-defined program editing one described d in chapter 10.1 will appear. However the [NEXT], [PREV], [ADD] and [INS] buttons are nowhere and the Test item is inactivated. (Of course, it should remain inactivated so that the key binding is possible.) By contrast, the Chart can be directly chosen and the [CHART], [LENS] and [MSG] buttons will be shown without the [SHIFT] button being selected.





We introduce briefly the elements of the Unit Test program in the left window.

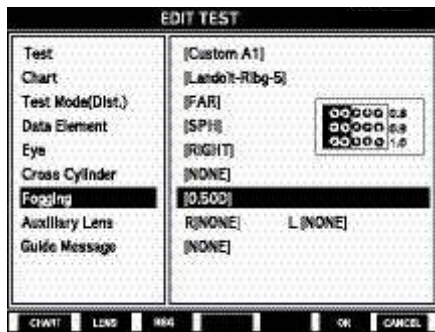
- Test: cannot be changed directly.
- Chart: assigns the chart to present. Contrary to the user-defined program, the relational Chart, Data Element, Cross Cylinder, fogging and Auxiliary Lens item would not be changed at all. To select this, press the Chart item immediately, use the dial, or press the [F1] button and turn the dial.
- Test Mode (Dist.): specifies near or far. Press the [F/N] button or turn the dial to select this
- Data Element: assigns SPH, CYL, AXS, ADD, VA, BIBO, BDBU or ADDVA. Use the dial or press the [S], [C], [A], [ADD], [VA], [BIBO], [BDBU] or [N ADD VA] button.
- Eye: assigns BINOCULAR, LEFT or RIGHT. Use the dial or press the [R], [OU] or [L] button to select this.
- Cross Cylinder: assigns 0.25, 0.50, DUAL Cross Cylinder. Use the dial to select this or press [1]/[2] buttons to select this.
- Fogging: assigns the amount of Fogging by using the dial between 0 and 1. Use [SHIFT] + [F6] (FOG+) to plus fogging, and [SHIFT] + [F7] (fog-) to minus fogging.
- Auxiliary Lens: assigns the right and left auxiliary lenses using the dial and the arrow buttons. Use the dial or press the [F2] button and select with the dial. Also Use [Open/Close] buttons.
- Guide Message: specifies guide message. Use the dial or press the [F3] button and select with the dial.

If you want to undo the current unit test, press [SHIFT] + [F3] (PRESET) button. Also if you want to clear the current unit test, press [SHIFT] + [F4] (clear) button.

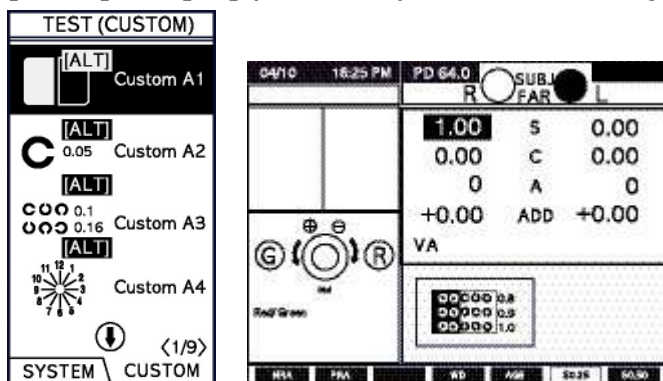
Now we will take the same way with the user-defined program to write down a unit test program in which the general VA chart puts on a Red/Green mask to takes the place of the Red/Green Test.

At first hand, press the Number Chart button. The chart with 0.9(25 in 20/20, 7.5 in 6/6) will be suitable matching for the patient's visual acuity. And press the Red/Green filter for Red/Green filter masking. At this point apply fog by about [0.5D] degree after selecting Fogging in the left window. And prepare to measure the right S value in Far Distance mode by pressing the [F/N], [S] and [R] buttons

consequently. Afterward, press the [F6] button to save and exit. Finally, press the [ALT] button and the Red/Green Filter Chart button to execute this unit test program. As a result, there will be fogged by 0.5D in the right eye and the Red/Green Filter will be placed in the Number Chart.



Of course, the user-defined Red/Green Filter Chart can be chosen by doing the [TEST] -> [F2] (CUSTOM) -> turn the dial procedures.

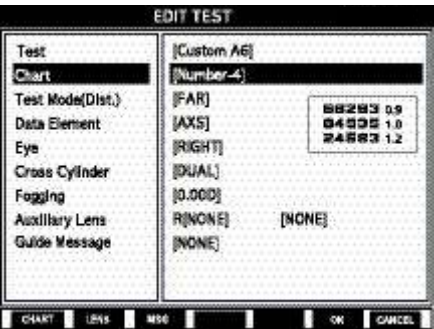


Let's take another example. Use a Number Chart instead of the dot Group Chart when processing the Dual Cross Cylinder Test. After pressing the [MENU] buttons, select "Edit Test" and push the [EXE] button so as to enter the Unit Test Program Edit function and select Dots Group Chart.

First, press the Number Chart Button. The chart with 0.6(50 in 20/20, 15 in 6/6) will be suitable matching for the patient’s visual acuity. Assign FAR to the Test Mode item, AXS to the Data Element item, RIGHT to the Eye item and DUAL to the Cross Cylinder item. Then the Cross Cylinder Test can be processed using the Number Chart instead of the Dots Group Chart.

Push the [F6] button to save and press the [ALT] and the Dots Group Chart button at a time to execute this unit test program. Consequently, the Dual Cross Cylinder will be placed in the right eye, the [AXS] will be reversed on the screen and the numeric chart will be spread.

You may be worried that the test combined with the basic buttons might be gone away if a unit test is made like this. However, GDR-7000 system prevents not to override the system-provided basic tests absolutely. Therefore there is no situation on earth that basic test of your system could not be processed by your accidental or intentional mistakes.



## 11 System-Defined Unit tests

There are total 29 kinds of system-defined unit test in GDR-7000 system. If you press [TEST] button and [F1] (SYSTEM) one after another, you can see the following list. We describe here each test to be referred to for the real optometry process.

- Near VA with ADD: Near Visual Acuity with Additional Spherical Power Test
- Near Point of convrg: Near point of Convergence Test
- Near Point of Accom: Near point of Accommodation Test
- Near ADD: Near Distance Additional Spherical Power Using Cross Grid Test
- Negative Relative Accom: Negative Relative Accommodation Test
- Positive Relative Accom: Positive Relative Accommodation Test
- Negative Relative Convrg: Negative Relative Convergence Test
- Positive Relative Convrg: positive Relative Convergence Test
- Cylinder Test – Power: Cylinder Power Test
- Cylinder Test – Axis: Cylinder Axis Test
- Red/Green Test: (monocular) Red/Green Test
- Cross Cyl. Test – Power: Cross Cylinder Test – Power
- Cross Cyl. Test – Axis: Cross Cylinder Test – Axis
- Cross Grid for Dist.: Cross Grid for Distance
- Dominant Eye for Phoria: Determining Dominant Eye for Phoria
- Hor. Maddox Rod: Horizontal Maddox Rod Test
- Vert. Maddox Rod: Vertical Maddox Rod Test
- Binocular Balance: Polarized Binocular Balance Test
- Polarized Red/Green : Polarized Red/ Green Test
- Worth 4 Dots: Worth 4 Dots Test
- Schober: Schober Test
- Vert. Von Graefe: Vrtical Von Graefe Test
- Hor. Von graefe: Horizontal Von Graefe Test
- Hor. Coincidence: Horizontal Coincidence Test
- Vert. Coincidence: Vertical Coincidence Test
- Pola. Cross: Polarized Cross without Fixation point Test
- Pola Cross w/Fixat'n: Polarized Crosss With Fixation point Test

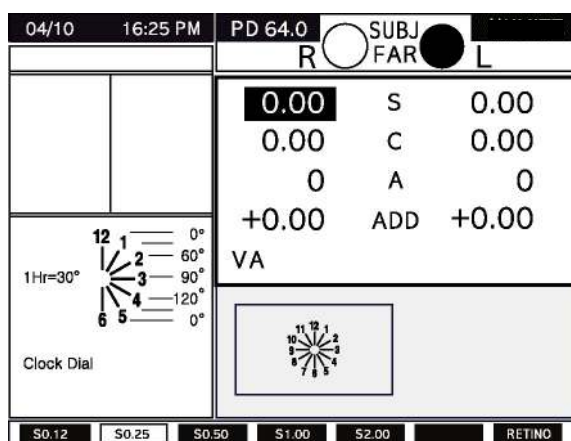
- Stereo: Stereo Test
- Minute Stereo: Minute Stereo Test

### 11.1 Cylinder Axis Test

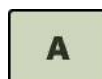
- Objective: To obtain maximum corrected monocular CYL value during the subjective test using the Clock Dial chart by 30 ° steps.
- Chart: Clock Dial chart
- Auxiliary Lens: None
- Expectation: All the rods on the screen can be seen uniformly clear.
- Operation Sequence:



1. Press the [R] or [L] button to select the desired field.
2. Press the Clock Dial chart To change into astigmatism
3. Press the [S] button to enter the spherical power mode and then apply fog till the numbers outside the Clock Dial appear to be clear.



5. If the answer is "All rods are seen uniformly clear", the patient has no astigmatism. Others, after multiplying the numerical of the rod by 30, press the [A] button to set the astigmatism.



4. Ask the patient which rod he/she sees more thickly and clearly than the others.

### 11.2 Cylinder Power Test

- Objective: To obtain the maximum corrected monocular CYL value during the subjective test the Clock Dial chart.
- Chart: Clock Dial chart
- Auxiliary: None

- **Expectation:** All the rods on the screen can be seen uniformly clear.
- **Operation Sequence:**



1. This test should be done after setting the Cylinder Axis.
2. Press the [R] or [L] button to select the desired field.
3. Press the Clock Dial chart to Change into astigmatism Measurement.



4. To enter the Cylinder Power mode, press the Clock Dial chart one more time or press the [C] button in astigmatism mode or press the [SHIFT] button and the Clock Dial Chart at a time.
5. Turn the dial in “-“ direction until all rods can be seen uniformly clear. At this time, the location of the thickest-looking rod can be changed. If then, adjust the Axis as the Following procedure.
  - Decrease the Axis value if the thickest-looking rod moves counterclockwise.
  - Increase the Axis value if the thickest-looking rod moves clockwise.

### 11.3 Monocular Red/Green Test

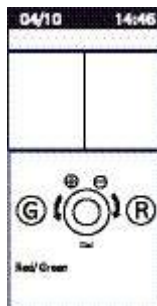
- **Objective:** To verify the maximum corrected monocular SPH value during the subjective test using the Red/Green chart.
- **Chart:** Red/Green chart
- **Auxiliary Lens:** None
- **Expectation:** The letters on the red and green ground can be seen uniformly clear.
- **Operation: Sequence:**



1. Select the desired field by pressing to the [R] or [L] button
  2. Change into the Red/Green mode by pressing the Red/Green chart.
  3. Apply fog if necessary and increase the SPH value by about 0.5D.
  4. change the SPH value till the letters on the red ground can have uniform clarity and thickness in the same level as those on the green one.
- If the letters on the red ground (left) are seen more clearly, turn the dial clockwise (“-“ direction)
  - If the letters on the green ground (right) are seen more clearly, turn the dial counterclockwise (“+“ direction)

**WARNING**

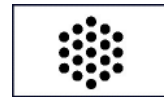
You should not ask the patient like “which letters do you see more clearly, on the red ground or on the green one?” According to the patient’s corrected visual acuity, in case of 1.0 (20 in 20/20, 6 in 6/6), ask concretely like “On which ground do you see the number 29 more clearly, red or green?” If the corrected visual acuity is lower, ask the patient to read the bigger letter (34,5) in the higher area.

**11.4 Jackson Cross Cylinder Test**

- **Objective:** To obtain the maximum corrected monocular CYL and AXIS values during the subjective test using the Jackson Cross Cylinder.
- **Chart:** Dots Group chart
- **Auxiliary Lens:** Cross Cylinder Lens (025/050)
- **Expectation:** The Dots Group Chart can be seen uniformly clear in spite of the up and down movement of the Cross Cylinder.
- **Operation Sequence:**



1. Select the desired field by pressing the [R] or [L] button



2. Press the Dots Group Chart to enter the Cross Cylinder mode.

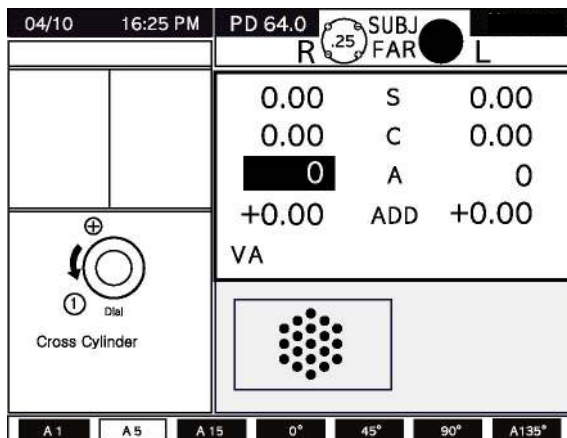


3. Press [SHIFT] + [F6] (025) OR [F7] (050) to change into the Jackson Cross Cylinder.



4. While pressing the button [1] and [2] alternately, ask the patient with which button he/she can be seen clearly, [1] or [2].

- If the result of button [1] is seen more clearly, turn the dial counterclockwise ("+" direction).
- If the result of button [2] is seen more clearly, turn the dial clockwise ("- " direction).
- This test is ended if there is no difference in the result of the button [1] and [2].





### 11.5 Dual Cross Cylinder Test

- **Objective:** To obtain the maximum corrected monocular CYL and AXIS during the subjective test using Dual Cross Cylinder.
- **Chart:** Dot group chart
- **Auxiliary Lens:** DUAL Cross Cylinder Lens
- **Expectation:** The Dots Group Chart divided into two parts in the same screen can be seen uniformly clear.
- **Operation Sequence:**



1. Select the desired field by pressing the [R] or [L] button

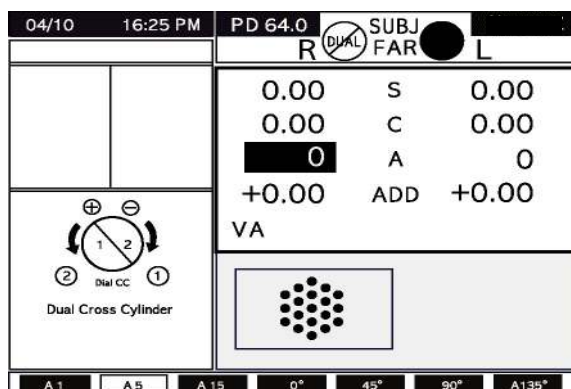


3. Press [SHIFT] + [F5] (DUAL) to change into the DUAL Cross Cylinder.

2. Press the Dots Group Chart to enter the Cross Cylinder mode.

4. The patient sees the Dots Group Chart as two divided parts. Referring to the left guide area showing the location of the two charts as the patient sees them, ask the patient as follows ;

- “Which chart do you see clearly, right or left?”
- “Which chart do you see clearly, up or down?”
- The answer will be right/left or up/down. After analyzing the location as area 1 or 2 comparing to guide area,
- 
- If the area 1 is seen more clearly, turn the dial counterclockwise (“+” direction).
- If the area 2 is seen more clearly, turn the dial clockwise (“-” direction).
- This test is ended if there is no difference in the area 1 and 2.



## 11.6 Cross Grid for Distance Test

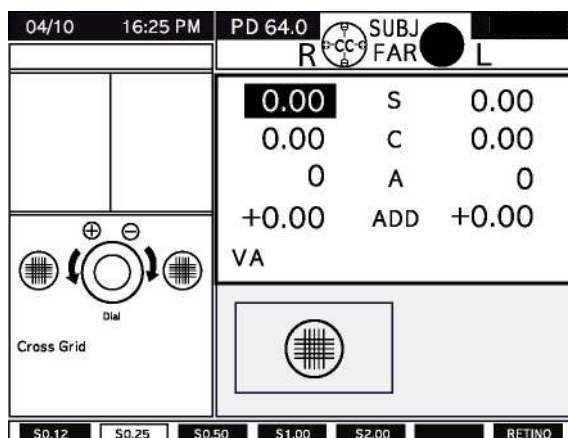
- **Objective:** To obtain the maximum corrected monocular SPH using Far Cross Grid chart. (Accommodation)
- **Chart:** Cross Grid for Distance chart
- **Auxiliary Lens:** Fixed Cross Cylinder Lens
- **Expectation:** The Horizontal and Vertical rods can be seen uniformly distributed and equally clear.
- **Operation Sequence:**



1. Select the desired field by pressing the [R] or [L] button.
  2. Press Cross Grid for Distance chart to enter This mode.
  3. Change the SPH value until the horizontal and vertical rods are Seen uniformly clearly and thickly.
- If the vertical rod is seen more clearly, turn the dial clockwise ("-” direction).
  - If the horizontal rod is seen more clearly, turn the dial counterclockwise ("+" direction).

### ! WARNING

You should correctly set astigmatism axis and cylindrical power before doing this test to prevent the influence of direct or indirect astigmatism. The Cross Grid for Distance test is very helpful to examine the patient with poor accommodation.



### 11.7 Finding Dominant Eye for Phoria Test

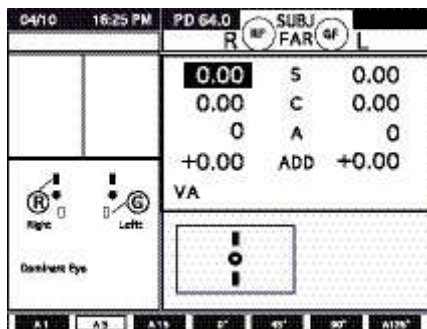
- Objective: TO find the dominant eye for phoria since the patient with phoria has dominant eye in a slightly different way compared to a normal case.
- Chart: the Dominant Eye for Phoria chart (with GCP-7000 only)
- Auxiliary Lens: Red Filter(right), Green Filter(left)
- Expectation: To check to which direction follows the fixation point, the red or green rod
- Operation Sequence:



1. Enter this mode by pressing the Dominant Eye for Phoria chart.

2. Ask the patient to which direction the Fixation point follows, red or green

- If "Red", the right eye is dominant.
- If "Green", the left eye is dominant.



## 11.8 Horizontal Maddox Test

- **Objective:** To execute a horizontal phoria test during the subjective test using the Maddox Rod.
- **Chart:** Maddox Rod chart
- **Auxiliary Lens:** Horizontal Maddox (right), Rotary Prism (left)
- **Expectation:** The vertical rod for the right eye is united with the Maddox Chart for the left eye.
- **Operation Sequence:**



1. Press the Maddox Chart to enter the Maddox Rod Test mode. The prism change window is Presented in the left-top area and the Guide Window in the left-bottom area.
2. Turn the dial till the patient says that the rod is united with the dot.

- If the vertical rod comes nearer to the right of the dot, turn the dial clockwise (“-” direction).
- If the rod comes nearer to the left of the dot, turn the dial counterclockwise (“+” direction).
- This test is ended if the rod is united with the dot.

04/10 14:46		PD 64.0		SUBJ	
		R		L	
Hor. Maddox Rod		0.00 S 0.00			
R L		0.00 C 0.00			
0.00 X</> 0.00		0 A 0			
0.00 Y</> 0.00		0.00 X</> 0.00			
		0.00 Y</> 0.00			
Hor. Maddox					
		<div> <div>P0.1</div> <div>P0.2</div> <div>P0.5</div> <div>OK</div> <div>CANCEL</div> </div>			

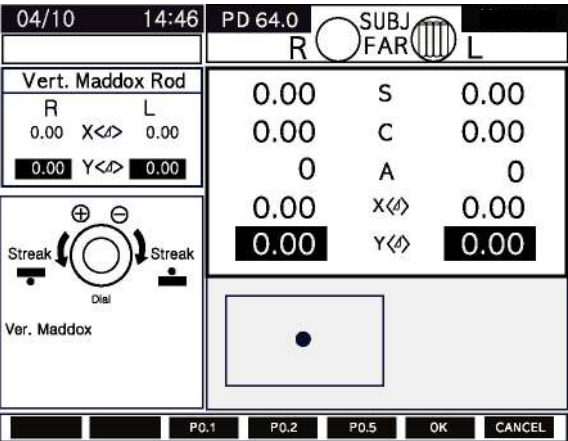
11.9 Vertical Maddox Test

- Objective: To execute a vertical Phoria test during the subjective test using the Maddox Rod chart.
- Chart: Maddox Rod chart
- Auxiliary Lens: Rotary prism (right), Vertical Maddox (left)
- Expectation: The horizontal rod for the left eye is united with the Maddox Chart for the right eye.
- Operation Sequence:



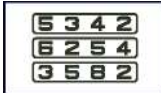
1. To enter this mode, press the Maddox Chart twice, or press the [BDBU] button and then press The Maddox chart, or press [SHIFT] button And the Maddox chart at a time. The prism change Window is presented in the left-top area and the Guide window in the left bottom area.

- If the vertical rod is located up the dot, turn the dial clockwise (“-” direction).
  - If the rod is located under the dot, turn the dial counterclockwise (“+” direction).
  - This test is ended if the rod is united with the dot.
2. Turn the dial till the patient says that the rod is united with the dot.



### 11.10 Polarized Binocular Balance Test

- Objective: To adjust binocular balance during the subjective test
- Chart: Polarized Binocular Balance chart
- Auxiliary Lens: 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- Expectation: The upper row for the right eye and the lower row for the left eye appear to be similarly clear.
- Operation Sequence:



1. To enter this mode, press the Polarized Binocular Balance Chart



2. Press the [OU] button to select all fields for both eyes and then apply for by about 0.5D when you can See the upper and lower charts all Together.

3. Ask the patient “Which row do you see more clearly except for the middle row, the upper or the lower?”

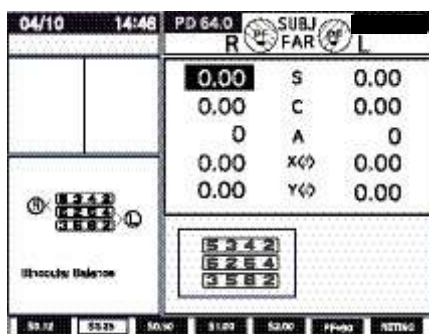


- If the upper row is seen more clearly, turn the dial counterclockwise while pressing [R] button to increase the right SPH value.
- If the lower row is seen more clearly, turn the dial counterclockwise while pressing [L] button to increase the left SPH value.
- Repeat this procedure till the upper and lower rows are seen uniformly clearly.

#### WARNING

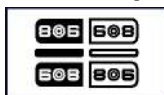
- If the patient has the dominant eye and the difference is equal to or less than 0.25D (maximum 0.5D), THE polarized Binocular Balance Test may be omitted because the patient has of course the better sight with the dominant eye.

When you are examining the patient with the dominant eye, the balance point cannot be found with Polarized Binocular Balance Test. In such case, pass this test with the dominant eye marked.



### 11.11 Polarized Red/Green Test

- **Objective:** To adjust the monocular and binocular balance at the same time during the subjective test.
- **Chart:** Polarized Red/Green chart
- **Auxiliary Lens:** 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- **Expectation:** The upper row for the right eye and the lower row for the left eye can be seen uniformly clear. Also the letters on the red and green ground appear to be similar when they are seen from the upper row for the right eye and the same is true for from the lower row for the left eye.
- **Operation Sequence:**



1. Press the Polarized Red/Green chart to enter this mode.



After pressing the [R] button, If the left side (red) is seen more clearly, turn the dial clockwise ("- direction).

If the right side (green) is seen more clearly, turn the dial counterclockwise ("+" direction).

2. Ask the patient on which ground the Letters in the upper row are seen more clearly, red or green.



After pressing the [L] button, If the left side (red) is seen more clearly, turn the dial clockwise ("- direction).

If the right side (green) is seen more clearly, turn the dial counterclockwise ("+" direction).

3. Ask the patient on which ground the letters in the lower row are seen more clearly, red or green



After pressing the [R] button, If the left side (red) is seen more clearly, turn the dial clockwise (“-” direction).

If the right side (green) is seen more clearly, turn the dial counterclockwise (“+” direction).



After pressing the [L] button, If the left side (red) is seen more clearly, turn the dial clockwise (“-” direction).

If the right side (green) is seen more clearly, turn the dial counterclockwise (“+” direction).

4. Adjust the binocular balance after the right and left maximum corrected monocular SPH values are balanced.

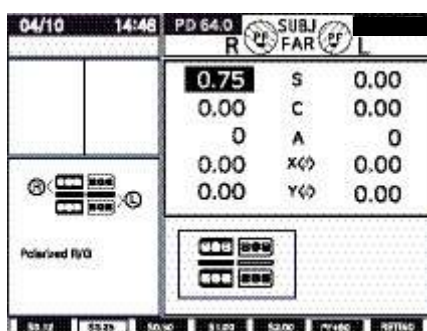


If the upper row is seen more clearly, turn the dial counterclockwise while pressing [R] button to increase right SPH value.



If the lower row is seen more clearly, turn the dial counterclockwise while pressing [L] button to increase left SPH value.

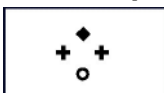
- Repeat this process until the whole sections are seen uniformly.





### 11.12 Worth 4 Dots Test

- **Objective:** To find suppression during the subjective test. It is possible to check the internal or external phoria.
- **Chart:** Worth-4-Dots chart
- **Auxiliary Lens:** Red Filter (right), Green Filter (left)
- **Expectation:** To check how many dots can be seen. Normally, 4 points are seen.
- **Operation Sequence:**



1. To enter this mode, press the Worth-4-Dots Chart.


2. Ask the patient how many bright points can be seen and what color is the lower circle.





- If the patient sees 4 points, it means normal fusion. If the lower circle appears to be red, then the right eye is dominant and if green, left.
- If the patient only sees 3 points, the right eye is suppressed, she/he cannot see the upper rhombus shape.
- If the patient only sees 2 points, the left eye is suppressed, she/he cannot see the cross shape.
- If the patient sees 5 points, the patient has phoria. If the red diamond shape is at the left side, external phoria, otherwise, internal phoria.
- If the patient sees 5 points and the three and the two flickers alternately, the right and left eyes are alternately suppressed.



#### **WARNING**

Perform phoria tests if the patient has phoria explicitly.

04/10 14:48 PD 64.0		SUBJ	
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		0.75	5 0.00
		0.00	C 0.00
		0	A 0
<input type="checkbox"/> OS Suppression <input type="checkbox"/> OD Suppression <input type="checkbox"/> Uncrossed(Eso) <input type="checkbox"/> Crossed(Exo)		0.00	X<> 0.00
Worth 4 Data		0.00	Y<> 0.00
			
		<input type="checkbox"/> 3 DOTS <input type="checkbox"/> 4 DOTS <input type="checkbox"/> 5 DOTS <input type="checkbox"/> 6 DOTS <input type="checkbox"/> 7 DOTS <input type="checkbox"/> 8 DOTS <input type="checkbox"/> 9 DOTS <input type="checkbox"/> 10 DOTS	

Vision of patient	Analysis	Details
4 spots 	Fusion	◇ red, + : green, ○ pink or red/green alternately ○ red : When the right eye is dominant. ○ Green: When the left eye is dominant.
3 spots 	Right eye is suppressed	Two green + and one ○ are seen
2 spots 	Left eye is suppressed	One red ◇ and one ○ are seen
5 spots 	Phoria	Red ◇ and green ++ are seen at the same time
5 spots (Flickering)	Alternately suppressed	Red ◇ and green ++ are seen at the same time

### 11.13 Schober Test

- Objective: To execute a phoria test during the subjective test using the Schober chart
- Chart: Schober chart
- Auxiliary Lens: Red Filter (right), Green Filter (left), Binocular Rotary Prism
- Expectation: To make the cross mark (for the right eye) placed the center of the circle.
- Operation Sequence:



1. Press the Schober chart to enter the Phoria mode.

#### 2. Ask the patient as follows;

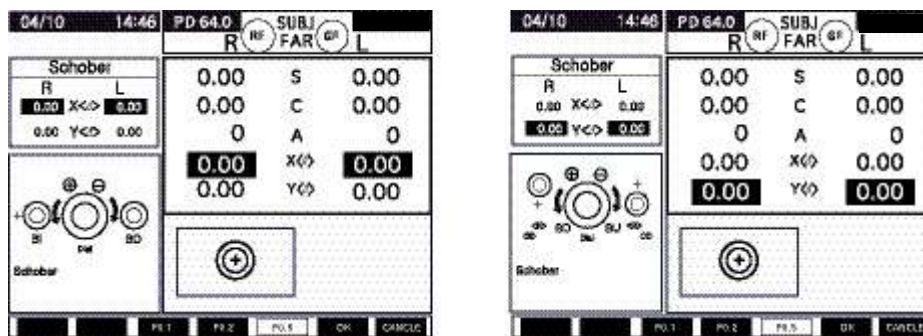
- "Can you see a red cross mark in a green circle?"
- If "Yes", finish this test since the patient has no phoria.
- If "No", continue this test since the patient has phoria.





#### 3. Ask the patient as follows;

- "Is the cross mark to the left or right of the circle?"
- If "Right", internal phoria (Esophoria). Turn the dial clockwise till the cross mark falls to the center of the circle.
- If "Left", external phoria (Exophoria). Turn the dial counterclockwise till the cross mark falls to the center of the circle.
- "Is the cross mark over or under the circle?"
- If "Over": left eye with hyperphoria. Press the Schober chart or the [BDBU] button once more and then turn the dial clockwise till the cross mark falls to the center of the circle.
- If "Under": the right eye with hyperphoria. Press the Schober chart or the [BDBU] button once more and then the dial counterclockwise till the cross mark falls to the center of the circle.



4. After finishing this test, press the [F6] button to save (each results of phoria tests is maintained separately) or the [F7] button to discard the result.



Vision of patient	Heterophoria	Correction Method
<p>The cross mark is to the right of the circle.</p> 	Esophoria	Turn the dial clockwise to add the BD prism till the cross mark comes to the center of the circle.
<p>The cross mark is to the left of the circle.</p> 	Esophoria	Turn the dial clockwise to add the BI prism till the cross mark comes to the center of the circle.
<p>The cross mark is over the circle.</p> 	Left Eye with hyperphoria	Press the [BDBU] button and turn the dial clockwise till the cross mark comes to the center of the circle.
<p>The cross mark is under the circle.</p> 	Right Eye with hyperphoria	Press the [BDBU] button and turn the dial counterclockwise till the cross mark comes to the center of the circle.

### 11.14 Horizontal Von Graefe Test

- Objective: To execute a horizontal phoria test using the Von Graefe chart
- Chart: Horizontal Von Graefe chart
- Auxiliary Lens: 6  $\Delta$  BU prism (right), Rotary prism (left)
- Expectation: To make the upper vertical rod and the lower vertical rod become vertically aligned in the center.
- Operation Sequence:



1. Press the Von Graefe Chart to enter  
The horizontal phoria mode.

#### 2. Ask the patient as follows;

- “Are the two vertical rods vertically aligned?”
- If “Yes”, finish this test since the patient has no phoria.
- If “No”, continue this test since the patient has phoria.

#### 3. Ask the patient as follows;

- “Which one is on the left among the two vertical rods?”
- If “The upper one”, Esophoria) Turn the dial clockwise to add the BO prism till the two rods are vertically aligned.
- If “The lower one”, Exophoria. Turn the dial counterclockwise to add the BI prism till the two rods are vertically aligned.



4. After finishing this test, press the [F6] button to save (each results of phoria tests is maintained separately) or the [F7] button to discard the result.

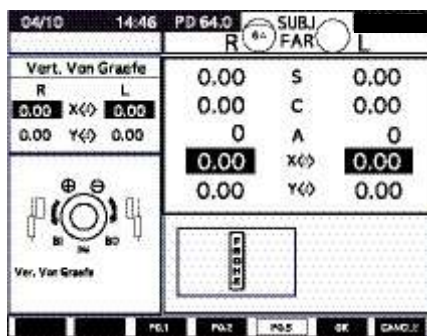


### WARNING

If you make use of an old-fashioned chart projector or a mirror chart not supporting the Von Graefe Chart, you can imitate the horizontal Von Graefe chart as follows;

1. Spread a general chart readable to patient such as number, Randolt Ring, Snellen E.
2. Press the vertical mask button to leave only one row.
3. Press the [BIBO] button to place the horizontal rotary prism.
4. Press the [6 $\Delta$ BU] button to place the auxiliary lens.

Note that if you are to use this method, you can neither record extra phoria test result nor refer to the guide window.



### 11.15 Vertical Von Graefe Test

- **Objective:** To execute a vertical phoria test during the subjective test using Von Graefe chart.
- **Chart:** Vertical Von Graefe chart
- **Auxiliary Lens:** Rotary prism (right), 10  $\Delta$  BI prism (left)
- **Expectation:** To make the right and left horizontal rod become horizontally aligned in the center.
- **Operation Sequence:**



1. To enter the vertical phoria mode, press the vertical Von Graefe Chart twice or use the [BDBU] button in the horizontal Von Graefe Test mode.

#### 2. Ask the patient as follows;

- "Are the two horizontal rods aligned?"
- If "Yes", finish this test since the patient has no phoria.
- If "No", continue this test since the patient has phoria.

#### 3. Ask the patient as follows;

- "Which one is higher among the two horizontal rods?"
- If "The left one": right eye with hyperphoria. Turn the dial counterclockwise to add the BD prism till the two rods are horizontally aligned.
- If "The right one": left eye with hyperphoria. Turn the dial clockwise to add the BU prism till the two rods are horizontally aligned.



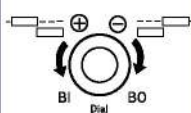
4. After finishing this test, press the [F6] button to save (each results of phoria tests is maintained separately) or the [F7] button to discard the result.

### ! WARNING

If you make use of an old-fashioned chart projector or a mirror chart not supporting the Von Graefe Chart, you can imitate the horizontal Von Graefe chart as follows;

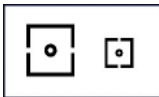
5. Spread a general chart readable to patient such as number, Randolt Ring, Snellen E.
6. Press the vertical mask button to leave only one row.
7. Press the [BDBU] button to place the horizontal rotary prism.
8. Press the [10△BU] button to place the auxiliary lens.

Note that if you are to use this method, you can neither record extra phoria test result nor refer to the guide window.

04/10 14:46		PD 64.0		SUBJ	
		R		L	
Vert. Von Graefe		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">             R 0.00 X&lt; &gt; 0.00 0.00 Y&lt; &gt; 0.00           </div> <div style="text-align: center;">             S 0.00 C 0 A 0.00 X&lt; &gt; 0.00 0.00 Y&lt; &gt; 0.00           </div> <div style="text-align: center;">             L 0.00 0.00 0 0.00 0.00           </div> </div>			
 Ver. Von Graefe		<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">PEOAT</div>			
		<div style="display: flex; justify-content: space-around; font-size: small;"> <span>P0.1</span> <span>P0.2</span> <span>P0.5</span> <span>OK</span> <span>CANCEL</span> </div>			

#### 11.16 Horizontal Coincidence Test

- **Objective:** To execute the Coincidence and a horizontal phoria test during the subjective test using Coincidence chart
- **Chart:** Horizontal Coincidence chart
- **Auxiliary Lens:** 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- **Expectation:** The upper frame for the right eye and the lower frame for the left eye form an ideal square.
- **Operation Sequence:**



- 1. Press the Coincidence chart to enter this mode.

## 2. Ask the patient as follows;

- “Can you see a square with a point at the center?” Are the right and left sides of the upper and lower frames aligned with each other?”
- If the upper one is to the right of the lower one: esophoria. Turn the dial clockwise to add the BO prism till the two frames are aligned.
- If the upper one is left of the lower one: exophoria. Turn the dial counterclockwise to add the BI prism till the two rods are aligned.



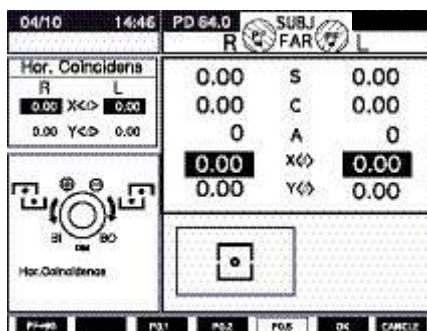
- 3. If you are satisfied with the test result, press the [F6] button to save (each results of phoria tests is maintained separately) or the [F7] button to discard the result. (One line equals to about 3.5% aniseikonia)

## 4. Continue this test by asking the following question if necessary.

- “Can you see the frames with a point at the center?” Are the two frames of the same size or not?”



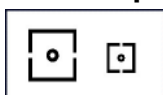
- If “Yes”, the patient has no aniseikonia. Press the [F1] button to select OK.
- If “No”, the patient has aniseikonia. Press the [F2] button to select NG.





### 11.17 Vertical Coincidence Test

- Objective: To execute a vertical phoria test during the subjective test using the Coincidence chart
- Chart: Vertical Coincidence chart
- Auxiliary Lens: 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- Expectation: The right frame for the right eye and the left frame for the left eye make ideal square
- Operation Sequence:



1. To enter this mode, press the Coincidence chart twice or [SHIFT] and coincidence chart at a time

2. Ask the patient as follows;

- “Can you see the square with a point at the center?” Are the upper or lower sides of the right and left frames aligned?”
- If the right one is higher ; left eye with hyperphoria. Turn the dial clockwise to add the BU prism till the two frames are aligned.
- If the left one is higher : right eye with hyperphoria. Turn the dial counterclockwise to add the BD prism till the two frames are aligned.



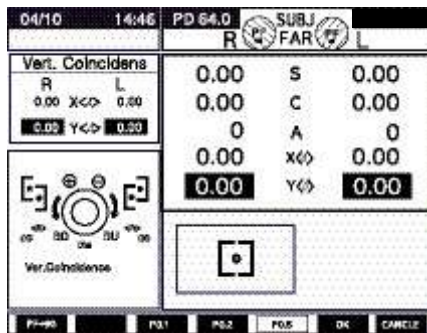
3. If you are satisfied with the test result, press the [F6] button to save (each results of phoria tests is maintained separately) or the [F7] button to discard the result. (One line equals to about 3.5% aniseikonia)

4. Continue this test by asking the following question if necessary.

- “Can you see the square with a point at the center?” Are the two frames of the same size or not?”

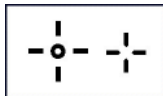


- If “Yes”, the patient has no aniseikonia. Press the [F1] button to select OK.
- If “No”, the patient has aniseikonia. Press the [F2] button to select NG.

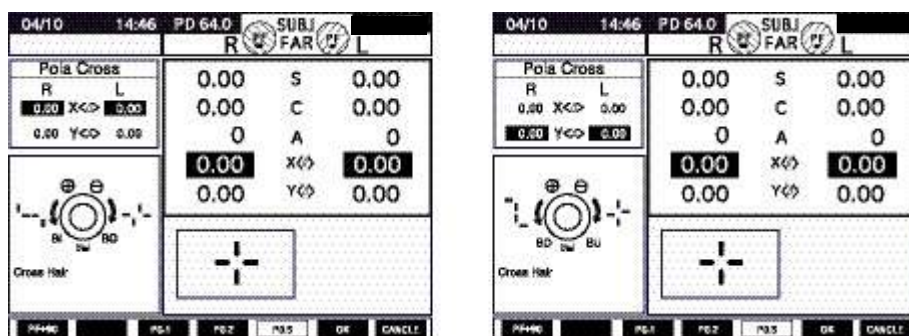


### 11.18 Polarized Cross without the fixation Point Test

- **Objective:** To execute a phoria test during the subjective test using the polarized Cross chart without the fixation Point chart
- **Chart:** Cross without the Fixation Point chart
- **Auxiliary Lens:** 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- **Expectation:** The upper-right cross mark for the right eye and the lower-left cross mark for the left eye are overlapped into one ideal cross.
- **Operation Sequence:**

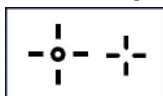


1. To enter this mode, press the Polarized Cross Chart twice or the [SHIFT] button And the Polarized Cross Chart at a time.
2. Ask the patient as follows;
  - “Can you see one ideal cross mark?”
  - If “Yes”, the patient has no phoria. All done.
  - If “No”, the patient has phoria. Continue the test.
3. At first, ask the patient to measure the horizontal phoria as follows;
  - “Is the “L” shape to the left of the “┐” shape or to the right of it?”
  - If “Right”, esophoria. Turn the dial clockwise to add the BO prism till they form a cross mark.
  - If “Left”, exophoria. Turn the dial counterclockwise to add the BI prism till they form a cross mark.
4. At secondhand, ask the patient to measure the vertical phoria as follows;
  - “Which shapre is higher, “┐” shape or “L” shapre?”
  - If “L” shape : left eye with hyperphoria. Turn the dial clockwise to add the BU prism till they form a cross mark.
  - If “┐” shape : right eye with hyperphoria. Turn the dial counterclockwise to add the BD prism till they form a cross mark.



### 11.19 Polarized Cross with the Fixation Point Test

- **Objective:** To execute the phoria test during the subjective test using the Polarized Cross chart with the Fixation Point chart.
- **Chart:** Polarized Cross with the Fixation Point chart
- **Auxiliary Lens:** 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- **Expectation:** The upper-right cross mark for the right sys and the lower-left cross mark for the left eye are overlapped into one ideal cross.
- **Operation Sequence:**



1. To enter this mode, press the Polarized Cross Chart.

#### 2. Ask the patient as follows;

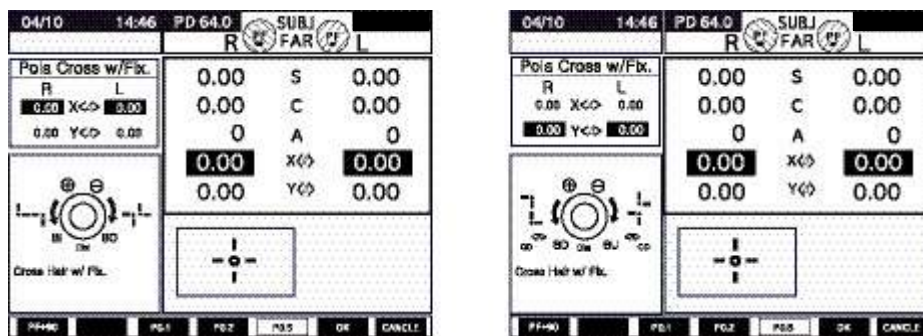
- "Can you see one ideal cross mark?"
- If "Yes", the patient has no phoria. All done.
- If "No", the patient has phoria. Continue the test.

3. At firsthand, ask the patient to measure the horizontal phoria as follows;

- "Is the " L" shape to the left of the "┐" shape or to the right of it?"
- If "Right", esophoria. Turn the dial clockwise to add the BO prism till they form a cross mark.
- If "Left", exophoria. Turn the dial counterclockwise to add the BI prism till they form a cross mark.

4. At secondhand, ask the patient to measure the vertical phoria as follows;

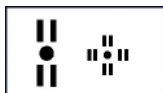
- "Which shape is higher, "┐" or " L" ?"
- If " L" shape : left eye with hyperphoria. Turn the dial clockwise to add the BU prism till they form a cross mark.
- If "┐" shape : right eye with hyperphoria. Turn the dial counterclockwise to add the BD prism till they form a cross mark.



Vision of patient	Heterophoria	Details
	Esophoria	Turn the dial clockwise to add the BO prism till the vertical bar comes to the of the horizontal bar.
	Esophoria	Turn the dial counterclockwise to add the BI prism till the vertical bar comes to the center of the horizontal bar.
	Left eye with hyperphoria	Press the [BDBU] button. Turn the dial clockwise till the horizontal bar comes to the center of the vertical bar.
	Right eye with hyperphoria	Press the [BDBU] button. Turn the dial counterclockwise till the horizontal bar comes to the center of the vertical bar.
	Esophoria + Right eye with hyperphoria	Correct the horizontal phoria like 1) and correct the vertical phoria like 4)
	Esophoria + Left eye with hyperphoria	Correct the horizontal phoria like 1) and correct the vertical phoria like 3)
	Exophoria + Right eye with hyperphoria	Correct the horizontal phoria like 2) and correct the vertical phoria like 4)
	Exophoria + Left eye with hyperphoria	Correct the horizontal phoria like 2) and correct the vertical phoria like 3)

## 11.20 Stereo Test

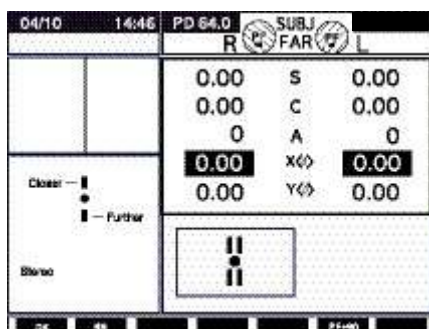
- Objective: To execute the Stereo test during the subjective test.
- Chart: Stereo chart
- Auxiliary Lens: 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- Expectation: The upper rod for the right eye appears to be closer to the patient than the lower rod for the left eye.
- Operation Sequence:



1. Press the Stereo Chart to enter this mode.

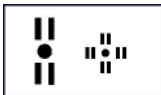
2. Ask the patient as follows;

- “Which rod appears closer, the upper or the lower?”
- If “the upper one”: There is no problem in stereo visual acuity. Press [F1] to mark OK.
- If “the lower one”: The patient could have stereo visual acuity but there might be analysis problem. Press [F2] to mark NG (no good)
- If “Neither” : the patient cannot have stereo visual acuity. Press [F2] to mark NG (no good).



### 11.21 Minute Stereo Test

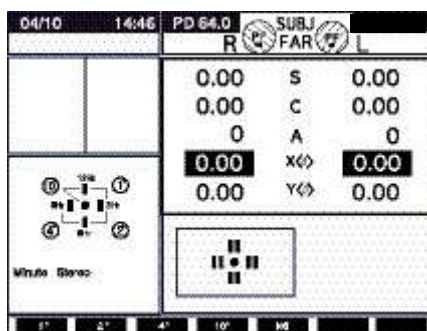
- **Objective:** To execute the Minute Stereo Test during the subjective test.
- **Chart:** Minute Stereo chart
- **Auxiliary Lens:** 135 ° Polarizing Filter (right), 45 ° Polarizing Filter (left)
- **Expectation:** Starting from the central fixation point, clockwise, the next rods pair appear to be more and more close and clear to the patient than the previous one.
- **Operation Sequence:**



1. To enter this mode, press the Stereo Chart twice or the [SHIFT] button and the Stereo Chart at a time.

#### 2. Ask the patient as follows;

- “How do you see the rods from the upper rods in 12 o'clock direction to 3, 6 and 9 o'clock directions one after another with the fixation point at the center?”
- If the rods in 12 and 3 o'clock directions appear stereoscopically: the patient can recognize up to 1 arc minute. Press the [F1] button to set 1 arc minute.
- If the rods in 3 and 6 o'clock directions appear stereoscopically: the patient can recognize up to 2 arc minutes. Press the [F2] button to set 2 arc minutes.
- If the rods in 6 and 9 o'clock directions appear stereoscopically: the patient can recognize up to 4 arc minutes. Press the [F3] button to set 4 arc minutes.
- “the upper one”: There is no problem in stereo visual acuity. Press [F1] to mark OK.
- If the rods in 12 o'clock direction and the central fixation point appear stereoscopically: the patient can recognize up to 10 arc minutes. Press the [F4] button to set 10 arc minutes.
- If all the rods including the central fixation point appear to be plain : the patient can recognize stereo vision. Press [F5] button to set NG (no good).



11.22 Near Point of Convergence Test

- Objective: To measure the nearest point at which convergence is possible.
- Chart: Near Distance chart
- Auxiliary Lens: None
- Expectation: To obtain BREAK and RECOVERY value
- Operation Sequence:



1. Press the [ N ADD VA] button and then the [F1] (NPC) button.



Alternately, press the [TEST] button and then select “Near Point of Converg.” Item and finally press the [EXE] button to execute this test.

2. Hang the Near Distance chart rod and adjust it with readable size for the patient. You can also test with a pen.
3. While bringing the Near Distance chart or the pen closer to the patient, find the spot where the letter on the chart or the top of the pen is divided into two. Write down this distance in the [F1] (BREAK) item.
4. To the contrary, while bringing the Near Distance chart or the pen closer to the patient, find the spot where the letter on the chart or the top of the pen already divided join together. Write down this distance in the [F2] (RECOV) item.

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		R		NEAR	
		O		L	
		0.00	S	0.00	
		0.00	C	0.00	
		0	A	0	
		0.00	ADD	0.00	
		ADD	VA		
Near Point of Convergence					
BREAK   cm					
RECOV   cm					
BREAK		RECOV		OK	CANCEL

### 11.23 Near Point of Accommodation Test

5. Objective: To measure the Near Point of Accommodation during the subjective test.
6. Chart: Near Distance chart
7. Auxiliary Lens: None
8. Expectation: To obtain the Near point of Accommodation for the right or left eye or for both eyes.
9. Operation Sequence:





## 11.24 Negative Relative Accommodation Test

**10.Objective: To measure the Negative Relative Accommodation Test during the subjective test.**

## 11. Chart: Near Distance chart

## 12. Auxiliary Lens: None

**13.Expectation: To obtain BLUR and RECOVERY value for the right or left eye or for both eyes.**

### 14. Operation Sequence:



**1. Press the [ N ADD #] button and then the [F1] (NRA) button.**



**Alternately, press the [TEST] button and then select “Negative Relative Accommodation..” Item and finally press the [EXE] button to execute this test.**



**2. Press the [R], [L], [OU] button to select the field to measure.**


**3. After pressing the [F1] (BLUR) button, place the Near Distance chart with 1.0 VA (20 in 20/20, 6 in 6/6) to 40cm away position from the patient's eye. Turn the dial to find the spot where the letters on the chart start to fade away. If the break spot has been found, press the [F2] (RECOV) button to enter recovery mode.**

- Find the recovery spot while turning the dial clockwise. Press the [F6] (OK) button to finish this test after the recovery spot has been found.

04/10	14:46	PD 64.0	SUBJ									
		R	ADD	L								
		0.00	S	0.00								
		0.00	C	0.00								
		0	A	0								
		0.00	ADD	0.00								
		VA										
Negative Relative Accommodation(+) <table border="1"> <tr> <td>R</td> <td>OU</td> <td>L</td> </tr> <tr> <td>BLUR</td> <td></td> <td>0.00</td> </tr> <tr> <td>RECOV</td> <td></td> <td>0.00</td> </tr> </table>		R	OU	L	BLUR		0.00	RECOV		0.00		
R	OU	L										
BLUR		0.00										
RECOV		0.00										
BLUR	RECOV	S0.25	S0.50	CANCEL								

## 11.25 Positive Relative Accommodation Test

- **Objective:** To measure Positive Relative Accommodation during the subjective test.
  - **Chart:** Near Distance chart
  - **Auxiliary Lens:** None
  - **Expectation:** To obtain BLUR and RECOVERY value for the right or left eye or for both eyes.
  - **Operation Sequence:**
1. Press the [ N ADD #] button and then the [F2] (PRA) button. Alternately, press the [TEST] button and then select “Positive Relative Accom..” Item and finally press the [EXE] button to execute this test.
  2. Press the [R], [L], [OU] button to select the field to measure.
  3. After pressing the [F1] (BLUR) button, place the Near Distance chart with 1.0 VA (20 in 20/20, 6 in 6/6) to 40cm away position from the patient’s eye. Turn the dial to find the spot where the letters on the chart start to fade away. If the break spot has been found, press the [F2] (RECOV) button to enter recovery mode.
  4. Find the recovery spot while turning the dial clockwise. Press the [F6] (OK) button to finish this test after the recovery spot has been found.

04/10 14:46		PD 64.0		SUBJ	
		R		ADD L	
		0.00	S	0.00	
		0.00	C	0.00	
		0	A	0	
		0.00	ADD	0.00	
		VA			
Positive Relative Accommodation (°)					
R	OU	L			
BLUR	0.00				
MECV	0.00				
					
BLUR	MECV	SO.25	SO.50	OK	CANCEL

### 11.26 Negative Relative Convergence Test

- **Objective:** To measure the Negative Convergence during the subjective test.
- **Chart:** Near Distance chart
- **Auxiliary Lens:** None
- **Expectation:** To obtain BLUR, BREAK and RECOVERY value for the right or left eye or for both eyes.
- **Operation Sequence:**

**F/N**



1. Press the [F/N] button to select near or far mode

2. Press the [BIBO] button and then the [F1] (NRC) button

**TEST**

**EXE**

Alternately, press the [TEST] button and then select "Positive Relative Accom.." Item and finally press the [EXE] button to execute this test.

3. In the far mode, horizontal Von Graefe Chart will be spread on the screen. In the Near Mode, lower the Von Graefe chart until it is placed to 40cm away position from the patient's eye so that the patient could see this chart.

4. After pressing the [F1] (BLUR) button, turn the dial counterclockwise to add the BI prism. Press the [F2] (BREAK) button by the time the chart starts to fade away. If there is no such spot and the chart appears to be divided into two, continue the test.

5. Continuously turn the dial counterclockwise to add the BI prism. Press the [F3] (RECOV) button by the time the chart is divided into two.

6. At this time, turn the dial clockwise to subtract the BI prism. Press the [F6] (OK) button when the charts come together. All done.

04/10 14:46		PD 64.0		SUBJ	
		R		L	
		NEAR			
		0.00	S	0.00	
		0.00	C	0.00	
		0	A	0	
		0.00	X<4>	0.00	
		0.00	Y<4>	0.00	
Negative Relative Convergence(BI) BLUR 0.00 BREAK 0.00 RECOV 0.00					
BLUR	BREAK	RECOV	P0.1	P0.5	OK CANCEL

- **Objective:** To measure the Positive Relative Convergence test during the subjective test.
- **Chart:** Near Distance chart
- **Auxiliary Lens:** None
- **Expectation:** To obtain BLUR, BREAK and RECOVERY value.
- **Operation Sequence:**

BI BO  
↔  
γ

- TEST EXE

8. At this time, turn the dial clockwise to subtract the BI prism. Press the [F6] (OK) button when the charts come together. All done.

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**11.28 Near Visual Acuity with Additional Spherical Power Test**

- Objective: To inspect the Near VA with ADD
- Chart: Near Distance chart
- Auxiliary Lens: None
- Expectation: To inspect Near VA with ADD for the right or left eye or for both eyes.
- Operation Sequence:



1. Press the [ N ADD VA] button and lower the Near Distance Chart.



2. Press the [R], [L], [OU] button to select the field to measure.

3. Write down each result for the right and left eye and for the both eyes.

Cf) This test may be executed after the 'Near Distance Additional Spherical Power Using the Cross Grid Test'

### 11.29 Near Distance Additional Spherical Power Using the Cross Grid Test

- Objective: To correct the ADD according to the accommodation using Cross Grid
- Chart: Near Distance (Cross Grid) chart
- Auxiliary Lens: None
- Expectation: To make the horizontal and vertical rods have the same clarity and the same width similar to Far Cross Grid Test.
- Operation Sequence:



1. Press the [ N ADD #] button and lower the Near Cross Grid chart to 40cm away position from the patients' eye



2. Press the [R], [L], [OU] button to select the field to measure.

### 3. Change the ADD value till the horizontal and vertical rods have the same clarity and width.

Write down each result for the right and left eye and for the both eyes.

- Turn the dial clockwise (“-“ direction) if the vertical bar is seen more clearly.
- Turn the dial counterclockwise (“+” direction) if the horizontal bar is seen more clearly.

04/10	14:46	PD 64.0	SUBJ	
		R	CC	L
		NEAR		
		0.00	S	0.00
		0.00	C	0.00
		0	A	0
		0.00	ADD	0.00
		VA		
Near Cross Grid				
NRA	PRA	WO	AGE	S0.25 S0.50

## 12 Examination Results and Printout

After finishing all the inspection processes, you may print the results either on the screen or on the paper. Since GDR-7000 system provides various options to save printing paper, refer the related Chapter 6, Configuration with this chapter.

### 12.1 How to Print

Since GDR-7000 system supports various modes such as EMPTY, [UA], [RK], [CLM], [SUBJ] and [FIN], it is recommended to consider carefully such modes when printing the results. GDR-7000 system follows the rules below.

- ① Prints the results from the [SUBJ] mode if the inspection has not performed in the [FIN] mode.
- ② Prints the result from the EMPTY mode if the inspection has not performed in the [SUBJ] mode.
- ③ Always prints the Ref/Kerato results from the [RK] mode. If the results from the [RK] mode have been changed arbitrarily, the changed value will be printed. Thus changing mode into the [SUBJ] mode should be necessary when starting with the data from auto automatic Ref/keratometer.

Accordingly, You don't have to care about modes since GDR-7000 system prints the results by finding the best-fit mode if you have normally carried out inspection using it. Nevertheless, it is recommended to process and prescribe in the [SUBJ] and [FIN] mode.

Press the [PRINT] button to print. If "Preview List" is set to YES, the [PRINT] button should be pressed once more. To display the results on preview screen, push [SHIFT] + [PRINT]. Then the summarized results will be shown either in table and graphical form on the LCD screen.

We will discuss printing on paper in 12.2 and printing on screen in 12.3.

## 12.2 Print on the Paper

If you configure options do as to carry out all the inspections and print all the results thoroughly, the printing results would be of great amount. However, it is not the ordinary case to do all inspection and to set the printing option FULL in order to save the printing paper. Thus, only the necessary items will be printed but we are going to describe all the items according to the printing order for illustration. There is a printing sample below: the left side is the printout and the right side is the item description. See chapter 11 Unit Test to know the meaning of the detailed items.

ID : P021209-0005	_____	Patient's identifier
Name: _____ M/F _____	_____	Patient's name and sex
Date: 2002/12/09 11:35	_____	Inspection Date and TIME
Age 39 Dominant Eye:R	_____	Patient's age and the dominant eye
PD = 66.0 / 61.5(NEAR)	_____	PD (near/Far)
WD = 40cm	_____	
*** Unaided VA ***	_____ ①	Unaided Visual Acuity
FAR: R OU L	_____	FAR
200 200 400	_____	
NEAR: 150	_____	NEAR
*** Lensometry Data ***	_____ ②	Data from Lensmeter
--[R]--- <CLM> ---[L]--	_____	
FAR:	_____	FAR
-1.50 SPH -1.75	_____	
0.00 CYL -0.25	_____	
90 AXS 135	_____	
+0.25 ADD +0.25	_____	
BI 0.50 X() BI 0.50	_____	
0.00 Y() 0.00	_____	
Aided VA: _____	_____	(Aided) Visual Acuity
R OU L	_____	
30 30 40	_____	
*** Refractometry Data ***	_____ ③	Data from Refractometer
FAR	_____	FAR
-5.50 SPH -6.00	_____	
0.00 CYL -1.00	_____	
0 AXS 109	_____	



*** Subjective Data ***	④	Data from Subjective Test
-[R]---<CLM>---[L] --		FAR
FAR		
-1.75    SPH    -2.00		
0.00    CYL    -0.25		
80      AXS    140		
+0.25    ADD    +0.25		
ADD VA:		Additional Visual Acuity
R      OU      L		
20		
0.00    X( )    0.00		
0.00    Y( )    0.00		Visual Acuity
VA:		
R      OU      L		
20     20     20		
NEAR:		NEAR
+0.25    SPH    +0.25		
0.00    CYL    0.00		
0        AXS    0		
0.00    ADD    0.00		
0.00            0.00		
VA:		Visual Acuity
*** Final Data ***	⑤	Final Data
-[R]---<CLM>---[L] --		FAR
FAR		
-1.75    SPH    -2.00		
0.00    CYL    -0.25		
80      AXS    140		
+0.25    ADD    +0.25		
ADD VA:		Additional Visual Acuity
0.00    X( )    0.00		
0.00    Y( )    0.00		
VA:		Visual Acuity

NEAR: _____		
+0.50	SPH	+0.50
0.00	CYL	0.00
0	AXS	0
0.00	ADD	0.00
0.00		0.00
VA: _____		
***Bin Visual Function*** ⑤		
NPC: _____		
7cm	10.5MA	67.3
NPA(OU): _____		
33cm	3.03D	
--BLR--BRK--RCV--		
NRA(OU): _____		
+1.00	/	+0.75
PRA(OU): _____		
-0.75	/	-0.50
<FAR> _____		
--BLR--BRK--RCV--		
NPC(Divergence): _____		
9.00	11.00	8.00
PRC(Convergence): _____		
10.00	12.00	9.00
*Schober: _____		
BO 0.50	X( ) BO 0.50	
0.00	Y( ) BD 0.50	
*Von Graefe: _____		
BO 0.50	X( ) BO 0.50	
0.00	Y( ) BD 0.00	
*Coincidence: _____		
BO 0.30	X( ) BO 0.30	
BU 0.10	Y( ) BD 0.10	

NEAR

Visual Acuity

Binocular Visual Function Test

NPC

NPA

NRA

PRA

FAR

NPC

PRC

Schober

Von Graefe

Coincidence

*Poia Cross:	
BO 0.50 X() BO 0.50	
0.00 Y() BU 0.50	
*Poia Cross w/Fix:	
0.00 X() BO 0.50	
0.00 Y() 0.00	
*Maddox Rod:	
BO 0.30 X() BO 0.30	
BU 0.10 Y() BU 0.10	
<NEAR>	
--BLR---BRK---RCV---	
NPC(Divergence):	
8.00 9.00 6.00	
PRC(Convergence):	
6.00 7.00 5.00	
*Schober:	
BO 1.00 X() BO 1.00	
0.00 Y() BD 0.50	
*Von Graefe:	
BO 0.30 X() BO 0.40	
BU 0.10 Y() BD 0.10	
*Coincidence:	
BO 0.60 X() BO 0.60	
BU 0.10 Y() BD 0.10	
*Pola Cross:	
BO 0.40 X() BO 0.40	
0.00 Y() 0.00	
*Poia Cross w/Fix:	
BO 0.30 X() BO 0.30	
0.00 Y() 0.00	
*Maddox Rod:	
BO 0.50 X() BO 0.50	
0.00 Y() 0.00	

Polarized Cross without Fixation Point

Polarized Cross with Fixation Point

Maddox Rod

NEAR

NPC

PRC

Schober

Von Graefe

Coincidence

Polarized Cross without Fixation Point

Polarized Cross with Fixation Point

Maddox Rod

<FAR> _____	FAR
Fusion(worth) : 5 Dots _____	Fusion
Stereo : OK _____	Stereo
Min. Stereo : 10 _____	Minute Stereo
Aniseikonia : _____	Aniseikonia
Hor.:OK Vert.: OK	
<NEAR> _____	NEAR
Fusion(worth) : 5 Dots _____	Fusion
Stereo : OK _____	Stereo
Min. Stereo : 10 _____	Minute Stereo
Aniseikonia : _____	Aniseikonia
Hor.:OK Vert.: OK	
<b>**Keratometry Data**</b> _____ ⑦	
---[R]---<R1>---[L]---	Data from Keratometry
7.79 mm 7.71	R1
43.25 D 43.75	
32 AXS 0	
---[R]---<R2>---[L]---	R2
7.78 mm 7.70	
43.37 D 43.75	
122 AXS 90	
Test Time = _____	Test Time

As we stated before, normally you don't have to print so many results like the previous sample. Thus, remove the unessential options in system configuration. Enter page 6, PRINT OPTIONS in system configuration menu to turn on and off the following options as your needs.

- **Print Subjective:** assigns the item to print when printing the results of the subjective test. You can select ALL (all data related to the subjective test), W/O UNAIDED VA (without unaided visual acuity: it doesn't print ① Unaided Visual Acuity), W/O BIN VF (without the results of the visual function test: it doesn't print ⑥ Data from binocular Visual Function Test), SUBJ & FIN ONLY (shows only SUBJ and FIN information) or OFF (prevents from printing the results from the subjective test: it doesn't print ④ Data from Subjective Test).
- **Print Objective:** assigns the items to print when printing the results of the objective test. You can select ALL (all data related to the objective test), [RK ONLY] (shows only RK information: it only prints ③ Data from Refractometer), [CLM ONLY] (show only CLM information: it only prints ② Data from lensmeter), or OFF (prevents from printing the results from the objective test, it doesn't print neither ③ Data from Refractometer nor ② Data from lensmeter). Default is [OFF]
- **Print Kerato Data:** assigns either [YES] (prints the ⑦ Data from Keratometry) or [NO] (doesn't print it).
- **Print  $\Delta$  Test Data:** assigns either [YES] (prints the information about prism among ⑥ Data from Binocular Visual Function Test) or [NO] (doesn't print prism related data)

6/7 PRINT OPTION	
Print Subjective	[ALL]
Print Objective	[OFF]
Print kerato Data	YES NO
Print $\Delta$ Test Data	YES NO
Preview List	YES NO
Auto Clear	YES NO
Auto Save	YES NO
Print To Serial	YES NO

BACK NEXT RESET OK CANCEL

### 12.3 Print On the Screen

If [SHIFT] + [PRINT] is pressed, the summarized information will be shown on the LCD screen. GDR-7000 system shows the results divided into NEAR and FAR in a condensed form and helps display conversion by using function buttons. See 6.1 “Test Results” for more information about summary result on screen.

If you want to print on the paper when looking at summary result on the screen, just press the [PRINT] button once more. Also, press the [F7] (Cancel) or the [ESC] button to return to the main screen.

## 13. Edit message

### 13.1 Introduction

GDR-7000 system has the intelligent message editor to rewrite the message. You can edit the following message.

- Program Name: to change user defined program name
- Test Name: to change user defined unit test name
- Test Guide: to change test guide message in the test
- Printer Footer: to change printer footer (in the case of internal printer)

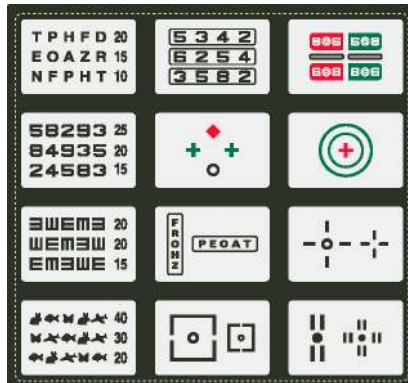
When you press 'MENU' and select 'Edit Message', the list you can edit appears.



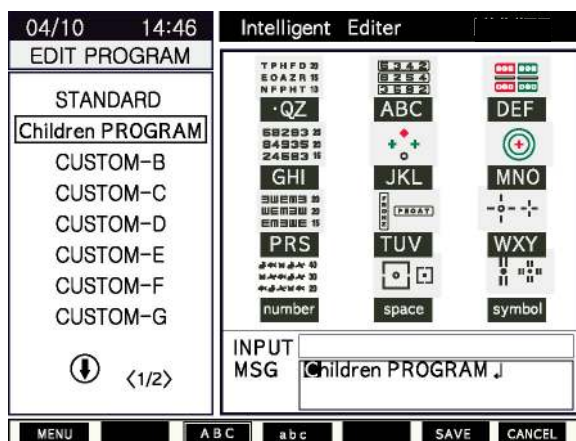
Select what you want to edit in the initial display and press [EXE], [SET] or [F6] (OK).

### 13.2 How to use intelligent message editor

You can print message by pressing the button on the operation panel. [figure 154] shows the keys for rewriting the message.

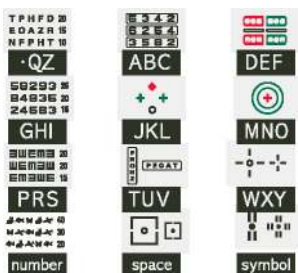


The intelligent message editor is divided in the three parts: Status & Configuration of the input button, INPUT and MSG.





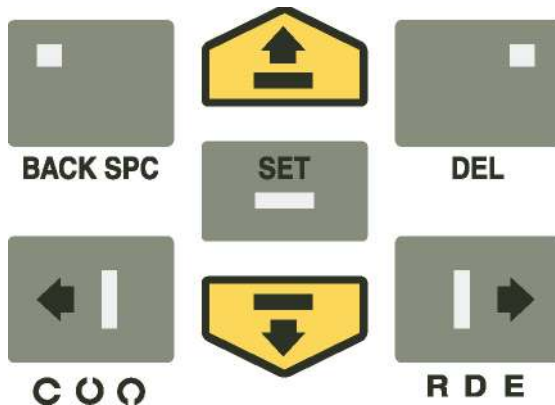
You can rewrite the message by using the buttons as shown at the [Figure 154]. When you press the key on the operation panel, the characters display on the INPUT. Each time you press key or turn dial, the character is changed (for example A-> B-> C-> A-> B-> C ··). if you press the wrong button, you are alarmed by beep sound.



For example, when you press [Von Graefe] Chart button, the letters T U V show on the INPUT line. If you want to write the alphabet 'U', you should press [Von Graefe] Chart button 2 times and press [SET] button. But there are some exceptions. First, if you press [number] button, 0 1 2 3 4 5 6 7 8 9 is display in the INPUT area, also if you press [symbol] button, ~ ! @ # \$ % ^ & \* ( ) - \_ = + ; : " / ' , < > ? [ ] is displayed in the INPUT area. Second, if you press [space] key, instead of displaying space in the INPUT area, space character is applied directly into the MSG area.

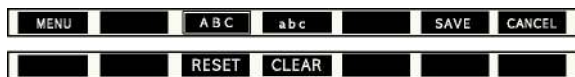
You can input numbers as the same way. When you press the VA chart for the children, the number sequence from 0 to 9 displays on the screen. Press the same key or turn dial on the operation panel to choose the number. When you press [SET] button (in the middle of the [Figure 157]), the selected number is inserted. If you press [SET] button again and again, the same number is inserted and inserted again in the MSG area. In this case, If the last character is reached in the end of MSG area, the control panel warns you using beep sound.

Finally, check the MSG editing area, Arrow shape (->)(s) is (are) displayed in the MSG area. You don't input any character after this symbol.



You can erase the part of or whole message by using [BACK SPC] or [DEL] button. When you press [BACK SPC] button, the letter before the cursor is deleted and when you press [DEL] button, the letter on the cursor is erased. [DEL] button erases the character on the cursor position, and the remaining characters move before one by one. [BACK SPC] button erases the previous letter on the cursor position, and the remaining characters including cursor position move before one by one.

You can move the cursor by using the arrow buttons shown at [Figure 157].

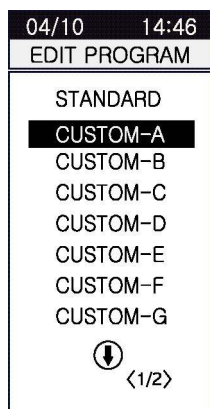


When you press [SHIFT], [F3] (RESET) and [F4] (CLEAR) display on the screen. Press [SHIFT] and [F3] button to revert the original message and press [SHIFT] and [F4] to delete the whole messages. You may use [F3] button to undo your mistake, but this button only affects before saving the message.

### 13.3 Editing of the Program Name

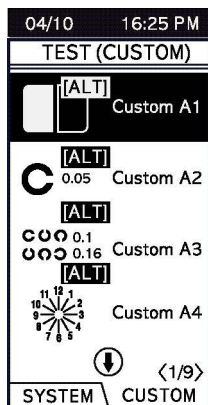
We recommend that you rename the user-defined program to prevent confusion. For example, if you name CUSTOM-A “Children PROGRAM”, you can easily understand the program. It is better to understand to use “My Own Standard” rather than “CUSTOM-B”.

Press [MENU] and select “ Edit Message” and “Program Name” in order to edit the user-defined program name. Choose the program name you want to edit and press [EXE] or [SET] or [F6](Edit). When you select CUSTOM-A as shown at [Figure 159], the initial program name ‘CUSTOM-A’ display on the MSG area. The maximum character size of program name is 17.



### 13.4 Editing of the Test Name

Press [MENU] and select “Edit Message” and “Test Name” in order to edit the user-defined test name. Choose the test name you want to edit and press [EXE] or [SET] or [F6](EDIT). When you select ‘CUSTOM A1’ as shown at [figure 160], the initial program name ‘CUSTOM A1’ displays on the MSG area. You can make 35 test names and write maximum 25 characters in three rows. But, it is impossible to change the system provide test name.



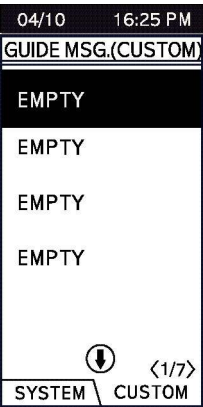
CANCEL

### 13.5 Editing of the Test Guide

GDR-7000 system provides the test guide message to help your eye examination. It appears on the left-button window of the screen. You can also change the test guide message as you want.

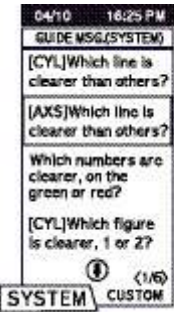
Press [MENU] and select “Edit Message” and “Test Guide”. Choose the test guide you want to edit and press [EXE] or [SET] or [F6](EDIT).

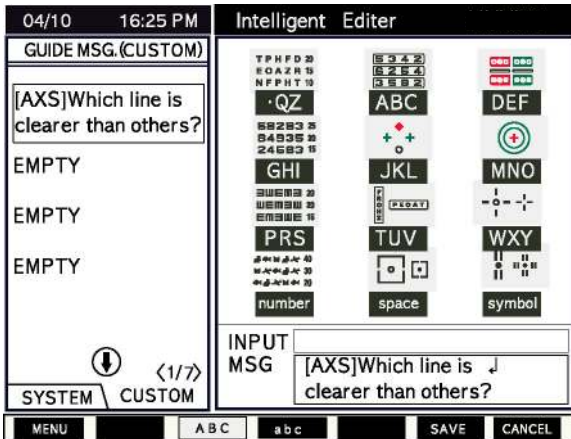
You can make a new guide message on one of empty slots (default value is EMPTY) or edit the exiting test guide message. It is possible to make 28 test guides and to write 54 characters at every test guide message. But, you cannot edit the system provided test guide message.




CANCEL

Because of the long length of the guide message, the intelligent message guide provides the function to copy and paste the message. Press [F1](SYSTEM) in “Test Guide” editing mode to open the list of the system test guide message. Choose the test guide message you need and press [F6](COPY) to copy the message. Return to the test guide list by pressing [F2](CUSTOM). Select the guide message you want to edit. Paste the messaged by pressing [SHIFT] and [F3](PASTE) at the same time Press [F6](EDIT) to start the editing.

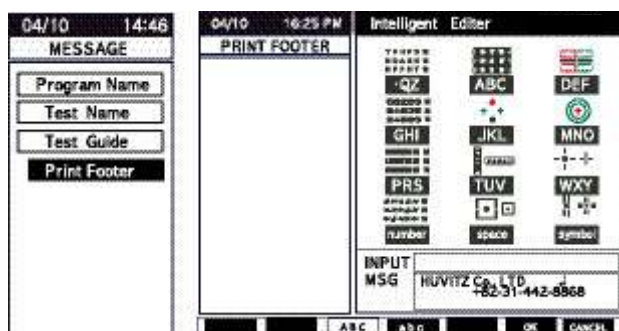




04/10	16:25 PM	PD 64.0	[SHIFT]
GUIDE MSG.(CUSTOM)		R	L
[AXS]Which line is clearer than others?		0.00	S 0.00
EMPTY		0.00	C 0.00
EMPTY		0	A 0
EMPTY		0.00	ADD 0.00
		VA	
 <1/7>		<div style="border: 1px solid black; padding: 5px; display: inline-block;">C 400</div>	
SYSTEM	CUSTOM		
ERASE	PASTE		CANCEL

### 13.6 Editing of the Printer Footer

You can print the prescription data including your shop name or telephone number. Press [MENU] and select “Edit Message” and “Printer Footer” to write the printer footer. You can write maximum 69 characters in three rows. Press [F6](OK) to save the message.



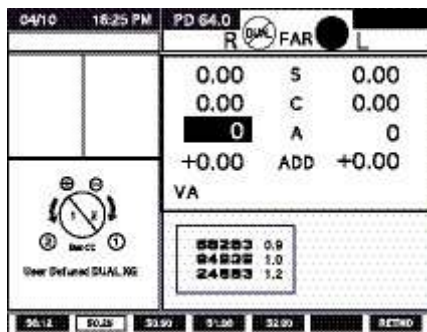
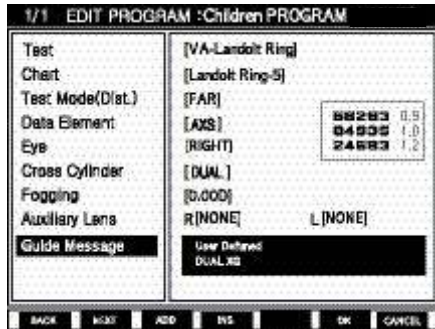
### 13.7 Input of the guide in the user-defined program and the user-defined unit test

You can write test guide while you make the user-defined program. Here is some example.

Support you make a new user-defined program as described at the chapter 10. At first, make any test guide as described at the 13.5 (eg, “User Defined DUAL XC”, “User Defined R/G”).

According to the chapter 10, open the Edit program window ([MENU] -> “Edit Program”.) Set Chart to Cumber, Test Mode to FAR, Data Element to AXS, Eye to RIGHT, Cross Cylinder to DUAL, fogging to 0.00D and Auxiliary Lens to None.

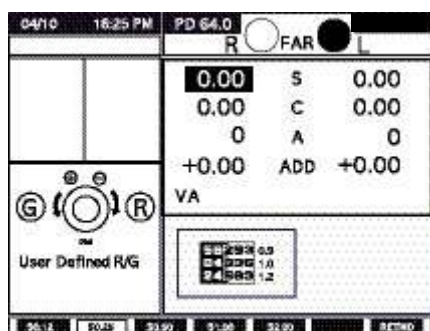
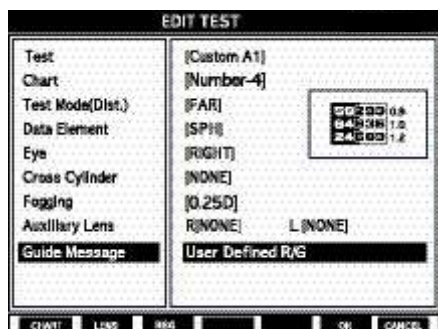
Finally, you should put Comment Msg. When you turn the dial, you see the test guides you make in advance. Select the test guide (eg, "User Defined DUAL XC") and save it. When you execute this program, the test guide display on the left window.



You can write test guide while you make the user-defined unit test. Suppose you make new user-defined unit test as described at the chapter 10. At first, make any test guide as described at the 13.5 (eg, User Defined R/G)



Open the Edit Test window ([EDIT] -> "Edit Test"). Set Chart to Number and R/G (press Number chart and R/G chat), Test Mode to FAR, Data Element to SPH, Eye to RIGHT, Cross Cylinder to NONE, fogging to 0.25D and Auxiliary Lens to NONE. Finally, you should put Comment Msg. When you turn the dial, you see the test guides you make in advance. Select the test guide (eg. "User Defined R/G") and save it. When you perform this test, the test guide display on the left window.



## Appendix A. Hardware Specification

Measurement Range	
Spherical Lens	-29.00 ~ +26.75D (Regular) -19.00 ~ +16.75D(Cross Cylinder, Prism test) (0.12D/0.25D/1.0D/2.0D/3.0D unit)
Cylinder Lens	0.0 ~ 8.75D (0.25D/1D/2D/3D unit)
Cylinder Axis	0 ° ~ 180 ° (1 ° / 5 ° / 15 ° unit)
PD	48 ~ 80mm (0.5/1mm unit) Near Working Distance : 35 ~ 70cm
Rotary Prism Lens	0 ~ 20△ (0.1△/0.2△/0.5△/1△/2△ unit)
Cross Cylinder	0.25D 0.50D 0.25D split prism lens (Dual Cross Cylinder)
Retinoscope	+1.5D, +2.0d (Measurement Distance 67cm, 50cm)
Dimension	
Digital Refractor	445 (W) X 130 (D) X 260(H)mm, 6.3kg
Control Panel	220 (W) X 230 (D) X 188(H)mm, 1.3kg (including internal printer)
Junction Box	240 (W) X 70 (D) X 250(H)mm, 1.9kg
Power Supply	. Digital Refractor : 5Vdc 3A, 18Vdc 4A . Operation Panel : 5Vdc 1A, 7.2Vdc 1A . Junction Box: 100~120/200~240 Vac 50/60Hz 1.3A
Auxiliary Lens	
Occluding Lens	
Pinhole Plate	φ 1mm
Maddox Rod	Right Eye (Red, Horizontal) Left eye (Red, Vertical)
Red/Green Filter	Right Eye (Red), Left Eye (Green)
Polarizing Filter	Right Eye (135 ° , 45 ° ) Left Eye (45 ° , 135 ° )
Split (dissociative) Prism	Right Eye (6△ BU) Left Eye (10△ BI : 0~5△ complement)
PD Check Lens	
Fixed Cross Cylinder Lens	(0.50D, Fixed with the axis set at 90 ° )
Visual Field	32 ° (Diameter : 32mm)

## **Appendix B. Replacement, Cleaning, and Power-off**

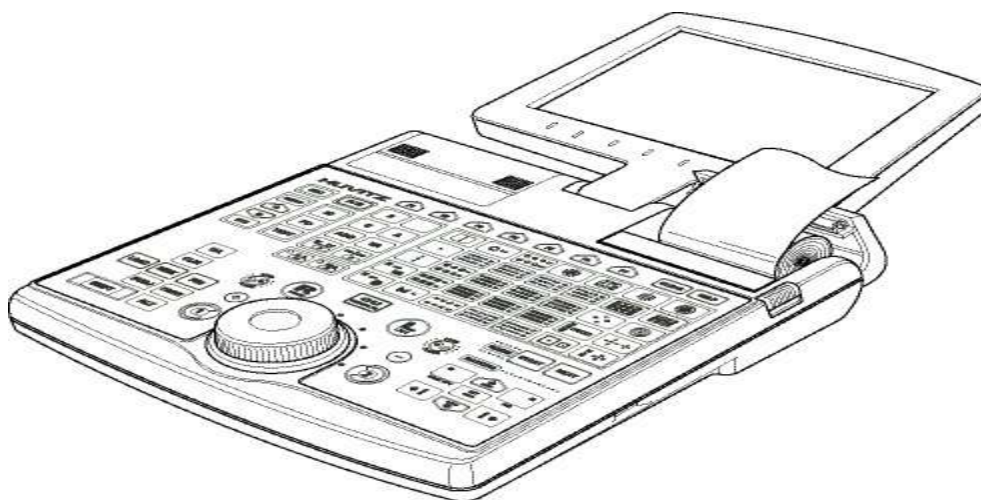
### **B.1 Printing Paper Replacement**

Replace the roll of printing paper as soon as possible after the red line appears on the paper.

- (1) Push the opening button in the right of printer cover.
- (2) Pull the remaining printing paper out.
- (3) Load the roll of paper into the printer case.

Note) check the printing side (smooth side must be up)

- (4) Pull out the end edge of the paper from the printer cover slot and close the cover.



### **B.2 Cleaning**

- (1) Basically, keep this instrument clean. Don't use volatile cleaners, thinner or benzene, etc.
- (2) Polish each head and operation panel with a dry cloth containing detergent solution.
- (3) When cleaning lens or glass of this instrument, clean it using a soft and dry tissue after removing dirt or other materials on the lens by wind blower.

### **B.3 How to power off this machine**

- (1) Turn OFF the power switch.
- (2) Disconnect the power cable.